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July
1944

Railway Mechanical Engineer

Published monthly by Simmons-Boardman Publishing Corporation, 1309 Noble Street, Philadelphia, Pa. Entered as second-class matter, April 3, 1933, at the Post Office at Philadelphia, Pa., under the act of March 3, 1879. Subscription price, $3.00 for one year, U. S. and Canada. Single copies, 35 cents. Vol. 118, No. 7.

RAILWAY MECHANICAL ENGINEER

(Name Registered, U. S. Patent Office)
With which is incorporated the RAILWAY ELECTRICAL ENGINEER.

Founded in 1832 as the American Rail-Road Journal

JULY, 1944

Volume 118 — *No. 7*

Published on the second day of each month by
Simmons-Boardman Publishing Corporation

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Railway Mechanical Engineer is a member of the Associated Business Papers (A. B. P.) and the Audit Bureau of Circulations (A. B. C.), is indexed by the Industrial Arts Index and also by the Engineering Index Service. PRINTED IN U. S. A.

30 Noble street, Philadelphia, Pa. Editorial and Executive Offices: 30 Church street, New York 7, and 105 West Adams street, Chicago 3. Branch offices: Terminal Tower, Cleveland 13; 1081 National Press bldg., Washington 4, D. C.; 1038 Henry bldg., Seattle 1, Wash.; 300 Montgomery street, Room 805-806, San Francisco 4, Calif.; 560 W. Sixth street, Los Angeles 14, Calif.

Subscriptions, payable in advance and postage free, United States, U. S. possessions and Canada: 1 year, $3; 2 years, $5. Foreign countries: 1 year, $4; 2 years, $7. Single copies, 35 cents. Address H. E. McGuiness, circulation manager, 30 Church street, New York 7.

Editorials:

Electrical Section:

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RAILWAY
MECHANICAL ENGINEER

The Mechanical Division Committees Report

IN this issue will be found abstracts of thirteen reports of committees of the Mechanical Division, Association of American Railroads, which would have been presented and discussed at the membership meeting on June 23 and 24 had this meeting not been cancelled. At its meeting held on June 22 and 23, however, the General Committee of the Mechanical Division approved these reports with a few modifications, and they can be made available to all of our readers without delay.

The reports of Mechanical Division committees seldom contain material which inspires spectacular headlines. Hence, the part played by this division of the A. A. R. in the steady advancement of the quality of railway service and in the effective functioning of rolling stock under the stress of wartime operation is seldom adequately appreciated even by officers and men on the railroads themselves.

The work of the Car Construction Committee and its associated committee of the American Railway Car Institute in quickly setting up a series of emergency car designs for all the railroads, followed by the Victory designs, which have demanded its attention during 1944, is one example. But even more typical of the vast amount of patient attention to detail necessary for the orderly progress of the railroads is the work of the Arbitration, Prices, and Specifications Committees. No long argument is necessary to convince the readers of this paper that what these committees do is as important in making smooth and orderly the administration of one field of cooperation endeavor among the independent corporations which make up America's railway system as are the results of the efforts of the other committees whose work bears more directly on the physical aspects of motive power and rolling stock.

But by no means all of the committee work of the Mechanical Division is of this humdrum character. At least five forward-looking developments affecting the future progress of railway transportation are recorded as under way or practically accomplished in this year's report of three committees. The Committee on Car Construction reports that the design of a lightweight merchandise car for high-speed service is being completed by the A. R. C. I. and that lightweight designs of general-service box and hopper cars are being produced as fast as war conditions will permit. This and the project of the Coupler and Draft Gear Committee for the development of an interlocking type of freight-car coupler, functioning in part similarly to the tight-lock passenger coupler, puts the Mechanical Division actively behind the exploitation of the possibilities of lightweight and higher speeds in freight service after the war.

Despite the delay caused by the war, the report of the Committee on Locomotive Construction gives evidence of the continuance of active interest in extending the use of the all-welded locomotive boiler. The fact is recorded that since the construction of the D. & H. boiler six furnaces for stress-relieving boilers have been built and another is under consideration.

Another high spot in these reports is the recommendation of the Committee on Locomotive Construction that the Mechanical Division accept A. S. A. standards for bolt heads, nuts, and threads. The value of as nearly universal standards as can possibly be adopted for types of manufacturers in such common use as bolts and nuts is generally recognized. Bringing as large an area of use as railway equipment within the fold will greatly enhance the value of the standards to all users.

The fifth item which seems worthy of inclusion in this list of high spots is the recommendation of the Committee on Car Construction that welding of cracks in cast-steel truck side frames of U-section cast since 1926, regardless of the length or depth of the cracks, be permitted by either the oxyacetylene or electric arc processes, using specified electrodes. This has much to recommend it as an immediate means of reducing the demand for replacement castings, and as a sound economy measure.

It is unfortunate that these reports have to be pre-

sented without the enlivenment of the discussion which many of them would, no doubt, have brought forth at St. Louis had the membership meeting of the Division not been cancelled. The work of the committees in preparing a complete set of formal reports available for distribution at one time has, however, not been lost. So complete a formal report as is presented in this issue is a recognition to which the members of these committees are clearly entitled. The hours of their crowded time which they devote to committee work play no less a part in the effectiveness of railway transportation in America than do the hours they spend on their immediate jobs.

Air Cylinders And Efficieney

The shop practice departments of the *Railway Mechanical Engineer* have included over the years numerous descriptions of shop kinks developed in the various locomotive and car shops of this country and Canada. These developments have usually resulted from the thoughtful interest and mechanical ingenuity of men directly concerned with shop output. Many of these have proved helpful to others and, in doing so, have served the purpose which lies behind the publication of such material. During recent years the development of jigs, fixtures and other devices has been especially valuable in aiding the output of work in the mechanical departments in the face of manpower shortages of a serious nature.

Recently, in commenting upon such descriptive items, a railway shop superintendent of many years' service pointed out in a half-joking fashion that, "They're all built of scrap and use too much compressed air." Of course, it is not true that all are built of scrap nor does it matter particularly if the device can be built as well of scrap as of new materials. The other part of the remark is all too true. Most shops today would be seriously affected if they were compelled to operate without homemade devices which employ second-hand air cylinders to apply the required working forces. The value of properly designed air-operated tools has long been recognized and the compressed air required for their use is well and economically applied. This certainly is not true of most of the shop-made devices, ingenious as they may be, which employ old cylinders from locomotives, ballast cars, passenger cars, etc.

Belt-drives from line shafting have been, and are still being, replaced widely with more flexible arrangements made possible through the application of electric motors to machine tools. It might also be well to study the various homemade devices now in use to determine whether or not the work which they are intended to perform cannot be done more effectively and economically by the installation of new equipment developed and manufactured especially for these jobs. Hoists, press brakes, pipe-bending arrangements, and similar equipment built of scrap and powered with air cylinders, often many times oversize for the work to be done, are wasteful of one of the more expensive service facilities in a shop.

Few roads are without instructions concerning the conservation of compressed air, and leaks in lines are run down and repaired with dispatch. But, a far greater leak in the supply occurs through the use of air for powering much home-built shop equipment. Without attempting to discourage the idea of developing tools to do a job, it is suggested that good ideas can be made even better if the designers build the needed tool and then provide power rather than assume that an old air cylinder will be the power source and so design the tool. Better still is learning whether a really efficient tool or machine is not commercially available to perform the required work.

Freight Cars Of the Future

The progress in freight-car design which the railway field expects will be made during the years immediately after the war involves two fairly distinctive sets of problems. These are reduction in weight and ability to operate at speeds in excess of 80 m.p.h.

The ground work for light weight has already been laid. There are now more than 20,000 freight cars in service in the construction of which materials other than plain carbon steel have been utilized—largely the corrosion-resistant low-alloy high strength steels which can be dealt with in the shop in the same way as the carbon steels. By the use of these materials, fabricated by welding, cars have been built having a pay load-to-gross load ratio of 80 per cent. The real problem with respect to light weight is the wide variation in braking ratio from empty to fully loaded which reaches the limit of safety for a single-capacity brake at a pay load-to-gross load ratio of about 75 per cent. The brake manufacturers have been at work on this problem for some time and present indications are that a solution will be forthcoming which will considerably narrow the field of present limitations on taking full advantage of possible savings in tare weight.

The desire for higher speeds in freight service raises several other questions the answers to which are not nearly so far along as is the designing for light weight. The development of freight-car trucks for high speeds has been under way for several years. The A. A. R. tests of trucks for high-speed freight service which were conducted in 1939 clarified the problem by bringing out, among other things, the fact that the needs of the critical speed range for snubber action are in conflict with the need for free and sensitive spring action in the high-speed range. The value of long spring travel to improve the vertical ride at high speeds was dem-

nstrated. One of the difficulties of accomplishing this s the limitations on the amount of spring deflection hich can be permitted without the risk of coupler eparation. The inter-locking coupler on the develop- ent of which work has already started promises some elief at this point. There is the further question hether a truck for the speed range contemplated will e satisfactory until it includes some provision for ushioned lateral motion approaching in function the wing hangers of the passenger-car truck.

When cars which weigh appreciably less are operated n the proposed high-speed range, will present draft ears be too stiff in initial compression? Further study s needed to determine the best method of cushioning nd shocks, particularly as speeds increase.

None of these problems is new. Nor are all of them ikely to be solved immediately. In the meantime ad- antage can be taken of the opportunity for weight aving offered by the strong or light-weight structural naterials as soon as priorities permit.

Can Equipment Meet the Needs?

According to a press release, issued under date of June 26 by the Office of War Information, both passenger and freight traffic handled by the railways have increased more rapidly than anticipated in the first half of 1944 and it is obvious that redoubled efforts and cooperation on the part of all concerned will be necessary to meet transportation requirements for the balance of the year.

In December, 1943, the Office of Defense Transportation estimated that the total passenger traffic for the year would be 85 billion revenue passenger-miles and that a 15 per cent increase might be expected in 1944. As a matter of fact, final 1943 figures reported to the Interstate Commerce Commission by 137 steam railroads showed a total of nearly 88 billion passenger-miles. Figures for the first quarter of 1944, reported by the same source, showed an increase of 25.5 per cent over the first quarter in 1943 and at this rate the 1944 total will exceed 110 billion, or more than double the 1922 figure of 54 billion revenue passenger-miles. Organized troop movements of one and one-half million service men and women each month require constant service of more than half of the Pullman cars and nearly one-third of all the day coaches. Almost an equal number of accommodations on the regularly scheduled trains are needed for the movement of military personnel on furlough.

The trend of freight traffic also has been constantly upward from 638 billion revenue ton-miles in 1942 to 727 billion in 1943 according to I. C. C. reports. The first quarter of 1944 showed a total of 182 billion ton-miles, an increase of 6.8 per cent over the same period last year. At this rate of increase total freight traffic for the year would reach 776 billion ton-miles or much more than earlier estimates. To meet traffic demands, railroads have only about two-thirds as many passenger cars and locomotives as in 1920. Since 1942, when a limited number were built, there have been no passenger cars constructed except 1,200 troop sleepers and military kitchen cars. Last year 800 locomotives were delivered and 1,200 more of various types are scheduled for delivery this year. Currently the railroads are carrying twice the amount of freight moved by rail in the last war with 600,000 fewer cars. More than 30,000 freight cars were built in 1943 according to reports of the American Railway Car Institute and, on April 1 of this year, 45,000 more were on order, some to be delivered on 1943 authorization and the rest on authorization of the War Production Board for 1944.

At the beginning of the war, shortage of critical materials was the key factor in preventing extensive additions of railway equipment, although the conversion of car-building plants to the manufacture of military equipment and supplies contributed to the difficulty of the railroads securing needed new rolling stock. Manpower shortages and war restrictions on improvements also played an important part in curtailing railway car construction.

Under the conditions, therefore, the transportation capacity of the railroads is already near its peak and, if military and civilian needs for the balance of the year are to be met, the railroads must be given every possible assistance both in securing new equipment, using that which they now have efficiently and spreading out the peak transportation load over as long a period this fall as possible.

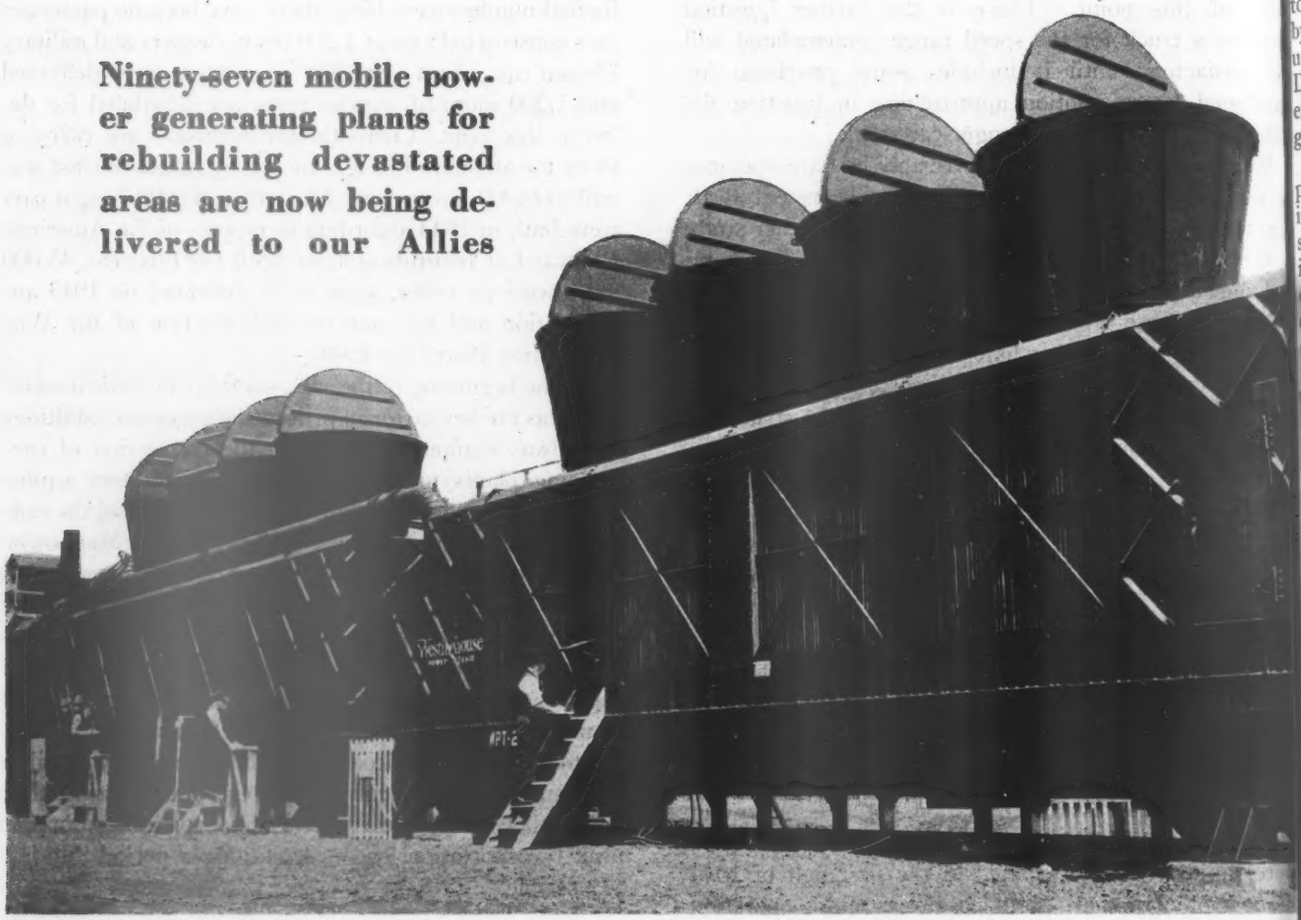
NEW BOOKS

PRINCIPLES OF POWDER METALLURGY. *By Franz Skaupy. Published by Philosophical Library, Inc., 15 East Fortieth street, New York. 80 pages, 6¼ by 9¼ in. Price, $3.*

The introduction to this book groups some instructive examples of the influence of the sizes and grains of the crystals of the metallic materials from which apparatus, tools and objects of daily life are formed and discusses how in some cases the position and form of the grain boundaries among the crystallites are of decisive influence on the properties of the substance. The General Part of the book which immediately follows the introduction is divided into two sections—Metal Powders and Production, and Properties of "Ceramic Metal" Parts—each of three chapters. "Ceramics" of wolfram, molybdenum, tantalum and other metals, and of hard metals are discussed in two chapters of a Special Part. The Appendix discusses further fields for the application of metal ceramics and bearing metals, also processes allied to metal ceramics.

Power Trains for Russia

Ninety-seven mobile power generating plants for rebuilding devastated areas are now being delivered to our Allies



The cooling tower cars for one of the 5,000-kw. trains

COMPLETE power generating plants mounted on specially-designed railroad cars for use in rebuilding devastated areas destroyed by war and for the operation of repair plants behind the lines are being delivered by the manufacturers. There are forty 3,000-kw. plants and twenty-three 1,000-kw. plants being supplied by the General Electric Company and the American Car and Foundry Company. The Westinghouse Electric & Manufacturing Company is supplying power units for ten 5,000-kw. trains and twenty-four 1,000-kw. trains. Cars for the 5,000-kw. trains are being supplied by the General Transportation Corporation. This company is also supplying boiler and turbine-generator cars for the 1,000-kw. Westinghouse units, while the American Car and Foundry Company is furnishing the cooling tower cars.

3,000-Kw. Trains

The 3,000-kw. mobile plant consists of seven or eight cars, depending upon the method of cooling. There are two boiler cars and tenders, one turbine car, one switchgear car, three cooling tower cars (or two radiator-type cooling cars), and one crew car. Thirty of the plants will have cooling tower cars; ten will have radiator-type coolers.

The two boiler cars each contain a fire-tube, locomotive-type boiler designed to operate at 300 lb. gauge, 600 deg. F. The boilers are coal-burning, employing poor grades of coal such as lignites with heat values of less than 7,000 B.t.u. per lb. Each boiler is rated 24,000 lb. of steam per hour. Induced draft is obtained by a centrifugal-type fan driven from a geared steam turbine and the turbine exhausts into a surface-type heater through which the condensate is pumped. The boiler is also equipped with an injector for emergency boiler feed, and automatic level feed control for normal operation. An adequate supply of coal and makeup water are carried on the tender car which is similar to that used on standard locomotives.

Coal and ashes are handled by means of portable unloaders and conveyors which can take the coal from either a pile or a coal car and put it in the tender, and which can take ashes from the ash pit and put it in cars.

The turbine car contains a 3,000-kw., 0.8 power factor, 3,750-kva., 3-phase turbine-generator arranged to deliver power at either 6,300 or 11,000 volts. The condenser is of the surface type, located on the same elevation as the turbine-generator. Connection of the condenser and turbine exhaust is made by means of an overhead duct. Vacuum is maintained by twin steam ejectors.

The switchgear car contains the main switchgear, which is of the metal-clad type and houses the indicating and control apparatus for the main generator, together with three oil circuit breakers, one generator circuit and two feeder circuits. The two feeder circuits are brought out through each side of the car near the top for connection to overhead lines. Auxiliary power supply is provided by a 300-kva. unit substation (500-kva. substations are used for the plants with radiator-type cooling). A 12-kw. Diesel engine-generator set is located in the car to supply energy for operating the boiler filling pump and emergency lighting.

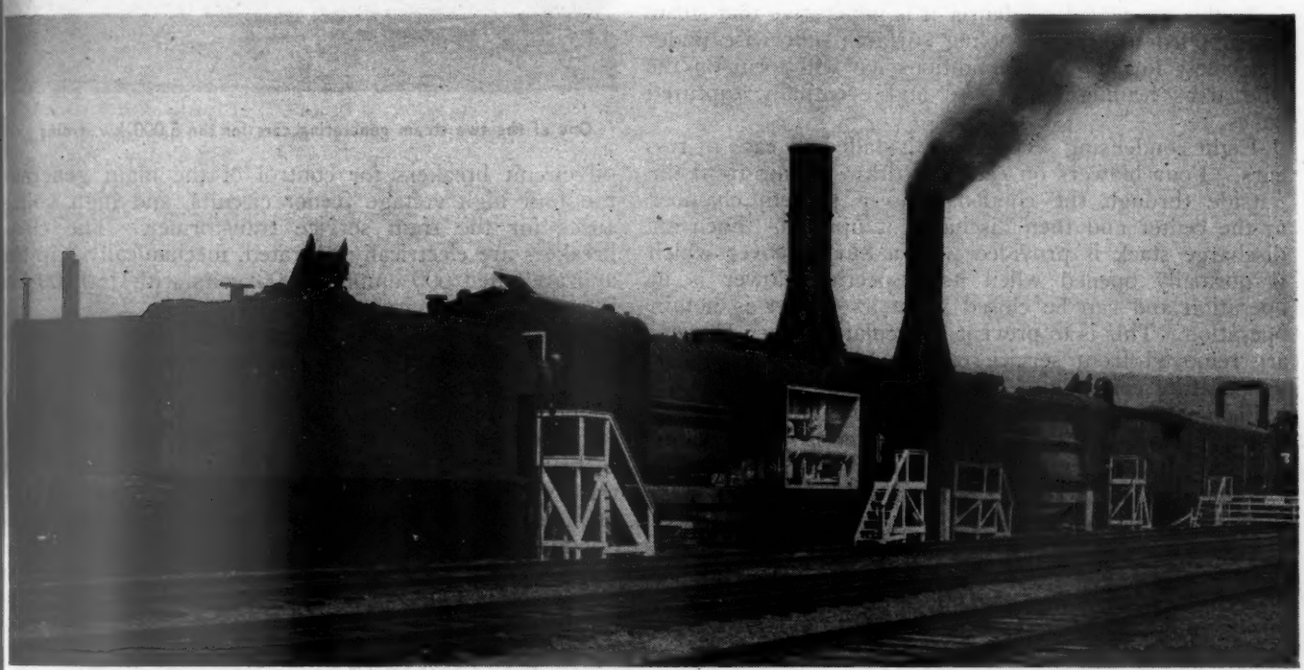
The three cooling tower cars for each of 30 of the power plants contain a wood cooling surface arranged in two cells. The wooden structure is mounted on a steel water basin on the car platform. The cooling air is supplied by four fans located in the top of the car and driven by direct-connected vertical motors. A vertical circulating pump directly connected to a motor is located on each car for pumping water through the condenser.

The two radiator-type cars for each of the other ten power plants contain cooling equipment consisting of tubes and fins assembled in units. Water is circulated through the inside of the tubes and air over the outside of the tubes and fins. The fans and cooling units are so arranged that cooling air can be recirculated to any degree required to prevent freezing of the cooling medium. The cooling surface is arranged so that a part may be used for bearing oil and related cooling. The cooling air is supplied by eight fans driven by direct-connected motors. A vertical circulating pump directly connected to a motor is located on each car for pumping water through the condenser.

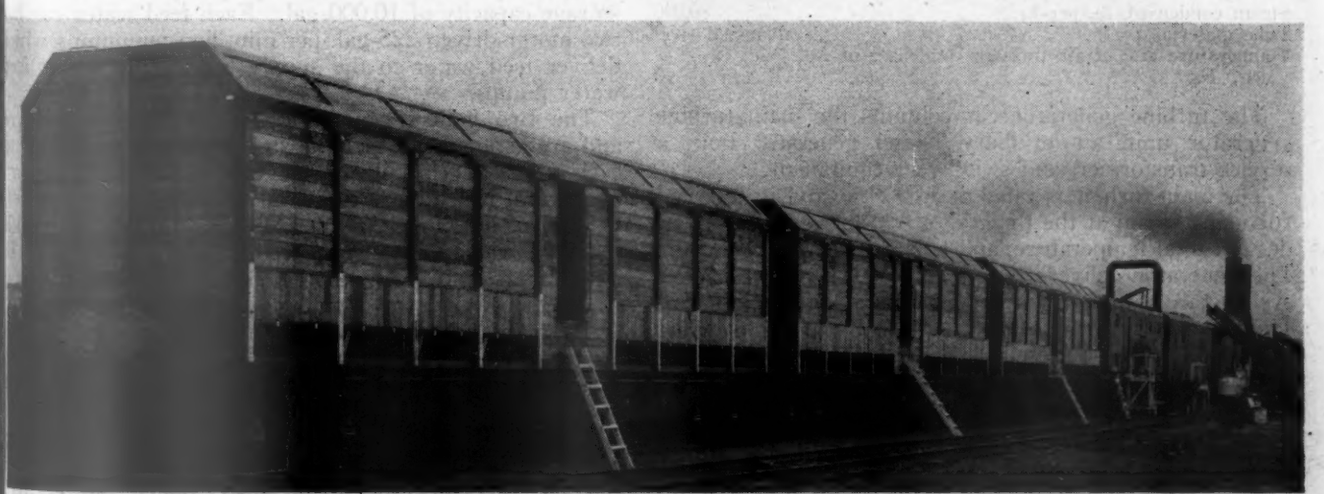
The crew car contains living and sleeping accommodations for the operators. A portion of the car is used as a maintenance room and test laboratory.

5,000-Kw. Trains

Eight railway cars of the freight type approximately



One of the 3,000-kw. power trains on the test track at Berwick, Pa.—Shown are the two boiler cars and the turbine car



The first three cars are cooling tower cars for a 3,000-kw. train; the fourth is the control car; the fifth the turbine car, and the sixth and seventh the boiler cars—Shown also are conveyances for putting coal on the tenders—The crew quarters car is not shown

50 ft. long are required to house and support the main and auxiliary power plant equipment of the 5,000-kw. train. All cars have double walls for all exposed surfaces with thermal insulation placed in the inter-wall space. Cars No. 1 and No. 2 are for the main steam condenser. Car No. 3 carries the main turbine-generator unit and switchboard, and car No. 4 the air compressors and the boiler feed water pump. No. 5 is the boiler feed water car, while the main steam generating equipment is on cars 6 and 7. The eighth car is used for a work shop and living quarters for the operating crew. Each train is supplied with the essential coal and ash handling equipment required to operate the power plant.

The main steam condensers are novel in that air is used as the cooling medium. The condenser is designed to condense the exhaust from the 5,000-kw. turbine at a maximum back pressure of 2 lb. per sq. in., when cooled by air at temperatures from minus 40 to 95 deg. F. The prime function of the condenser is the recovery of condensate.

In this air-cooled condenser it is imperative that steam be supplied to all the cooling surface; otherwise under extremely low ambient conditions ice will form on the idle areas leading to blocked and eventually ruptured tubes.

Eight condensing sections are installed on each of two cars. Four blowers on each car draw the air from the outside through the condenser to a plenum chamber at the center and then discharge it upward. Each air discharge stack is provided with a hinged cover which is normally opened when its respective blower is in operation and can be closed when its blower is not in operation. This is to prevent recirculation when blowers are removed from service on account of low ambient temperature conditions.

Each condenser car is equipped with a single-stage ejector and an air-cooled after condenser. The chief function of the ejector is to keep air from collecting in the condenser sections, resulting in cold spots and possible ice formation.

The condensate dropping from the tubes is reheated and deaerated by the incoming steam before it is picked up by the condensate pumps and returned to the boiler.

The following statistical information applies to these air-cooled condensers:

Total fin surface, sq. ft.	90,000
Total tube surface, sq. ft.	10,500
Cooling air through condenser, c.f.m.	800,000
Steam condensed, lb. per hr.	80,000
Tube material	Galvanized steel
Temperature rise of air through condenser at full load, deg. F.	90

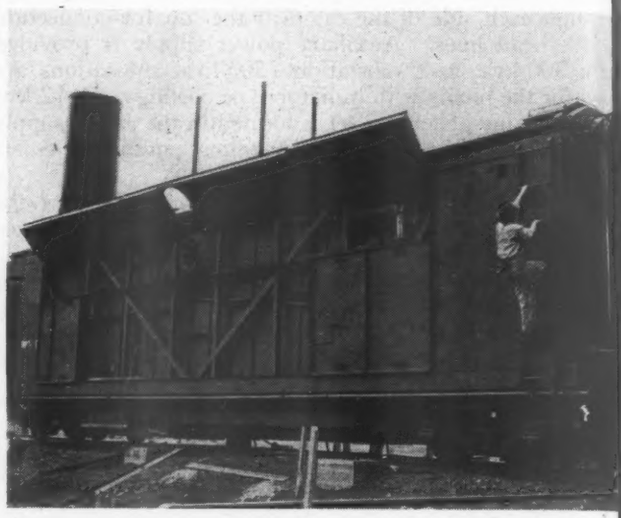
The turbine generator car contains the main turbine generator unit, an auxiliary Diesel generator unit, a service transformer, and switchgear equipment.

The main turbine is rated at 5,000 kw. and is designed for using steam at the throttle of 600 lb. per sq. in., 750 deg. F. total temperature, and exhaust at 2 lb. per sq. in The generator delivers power at 6,300/10,900 volts, 50 cycles, 0.8 power factor, 3,000 r.p.m., and 6,250 kva. The generator is equipped with air filters to aid in maintaining cleanliness of the machine.

Power for the train auxiliaries is furnished by the 750-kva. air-cooled transformer at 380/220 volt, 3-phase, 50-cycle, 4-wire. The transformer is connected to the 5,000-kw. generator through fuses and is provided with a low voltage breaker assembly for motor and lighting service. The breaker assembly is mounted within the transformer housing.

For use in starting up, a 93.8-kva., 75-kw., 380/220-volt, 4-wire, 50-cycle Diesel engine-driven generator is provided.

The totally enclosed metal-clad switchgear contai



One of the two steam generating cars for the 5,000-kw. trains

oil circuit breakers for control of the main generator the four high voltage feeder circuits, and high voltag fuses for the train service transformer. The circui breakers are electrically operated, mechanically trip-fre and are rated 600 amp., 15,000 volts with 150,000 kva interrupting capacity.

Car No. 4 contains the following auxiliaries: Tw 3,600 r.p.m. boiler feed water pumps driven by stea turbines; one evaporator unit of sufficient capacity t supply the required makeup of 2,400 lb. per hr. of 32 deg F. water; a deaerator to remove the air from the makeup a small motor-driven water pump for delivering treate water to the evaporator; one set of water treating equip ment and three 400 cu. ft. per min. air compressors, on of which is driven by a direct-connected 100 hp., 50-cycle 720 r.p.m. induction motor and the other two driven b turbines through speed reducing gears. The com pressors supply air to operate the boiler stokers, coa spreaders, and soot blowers. There are also an air stor age tank, water cooling tower and pump.

The boiler feed water car, which is thermally insu lated and provided with heating coils, has a feed wate storage capacity of 10,000 gal. Each feed water car ha two motor-driven 225-gal. per min. booster pumps whic deliver feed water to the supply line of the boiler fee water pumps.

The two boilers car units are essentially duplicate and are arranged so that the stoker ends are adjacent t each other. Each boiler car contains a 40,000-lb. per hr. two-drum, bent-tube, water-wall boiler designed for 66 lb. per sq. in. gauge, 750 deg. F. total temperature wit the feed water entering the economizer at 200 deg. F The boilers were designed and built by the Combustion Engineering Company.

The cars are also equipped with a superheater, a economizer, soot blowers and a locomotive type stoker These devices are air operated to minimize the amoun of makeup water. There are also two 9,900 cu. ft. per min. motor-driven forced draft fans and one two-speed 46,000 cu. ft. per min. motor-driven induced draft fan and the necessary measuring instruments and contro equipment.

The service car provides living quarters for the oper ating crew and space for light repair work.

1,000-Kw. Trains

The 1,000-kw. power trains are all essentially similar. They consist of one boiler car, one turbine-generator car, one cooling tower car, and coal handling equipment. Each car is mounted on two four-wheel trucks. The boiler car contains a 16,000-lb. per hr., two-drum water tube boiler designed for 420 lb. and 730 deg. F. The boiler is being designed, built, and assembled as a package unit on the car by the Babcock & Wilcox Company. This car also includes a locomotive type over-feed coal stoker, a steam-operated stoker feed engine, a 50-hp. motor-driven induced draft fan, water treating equipment, an auxiliary steam driven boiler feed pump, a coal hopper, and a water storage tank.

The turbine generator car contains a 1,000-kw., 0.8 power factor, 350-kva., 3-phase, 50-cycle, 1,000-r.p.m., 6,300-volt generator which is driven through a reducing gear by a steam turbine which is designed for using steam at 400 lb. per sq. in. and 725 deg. F. and exhaust pressures of 2 to 5 in. h.g. absolute pressure.

The car is also equipped with an 1,100-sq. ft., 3-pass semi-radial flow type condenser with non-divided water boxes and a motor-driven condensate pump. The deaerating hot wheel is mounted directly beneath and forms an integral part of the condenser. The main boiler feed pump is motor-driven.

Circuit control and protection is provided for by a 6,300-volt, metal-clad switchgear including oil circuit breakers for the two 6,300-volt feeder circuits and the main generator circuit. The breakers are rated at 600 amp., 7,500-volts, 50,000-kva. interrupting capacity. A 125-kva., 380/220 volt, 3-phase, air-cooled transformer connected through fuses to the main generator bus serves as an auxiliary power supply.

A 5-kw., 3-phase, 380/220-volt gasoline engine-generator set is used for starting up and for emergency auxiliary power service. The boiler cars and the turbine-generator cars, mounting Westinghouse equipment, were designed and built by the General American Transportation Co. at Chicago. The units built by the General Electric Company are mounted on American Car and Foundry Company cars. The cooling tower cars are identical with those used for the 3,000-kw. trains. They are built by the American Car and Foundry Company, and the cooling towers were designed and pre-fabricated by the Foster-Wheeler Corporation.

Letter To The Editor

Some Services Should Be Improved Now

Many things we are doing now will have considerable bearing on postwar passenger travel. We are confronted with the problem of servicing and maintaining air-conditioning equipment with a restricted amount of Freon refrigerant. All belting, both flat and Vee type, is hard to procure, and all mechanical parts and replacements for motors, pumps and other equipment can be ordered only on priority ratings.

On the other hand, we are hauling more people per car than ever before, which increases the load on our air-conditioning equipment. These people, who, we hope, will be our postwar customers, will remember vividly every inconvenience they suffer now, from hot cars, poor food, and critical or unpleasant employees. Some will continue to travel and the rest are going to try another railroad, bus or private car.

I am certain that part of this can be overcome by a program of education of all employees concerned, stressing the fact that cleanliness of the equipment, proper repairs, if only of a temporary nature, and politeness on the part of all employees that contact the traveling public, will pay dividends in the postwar travel.

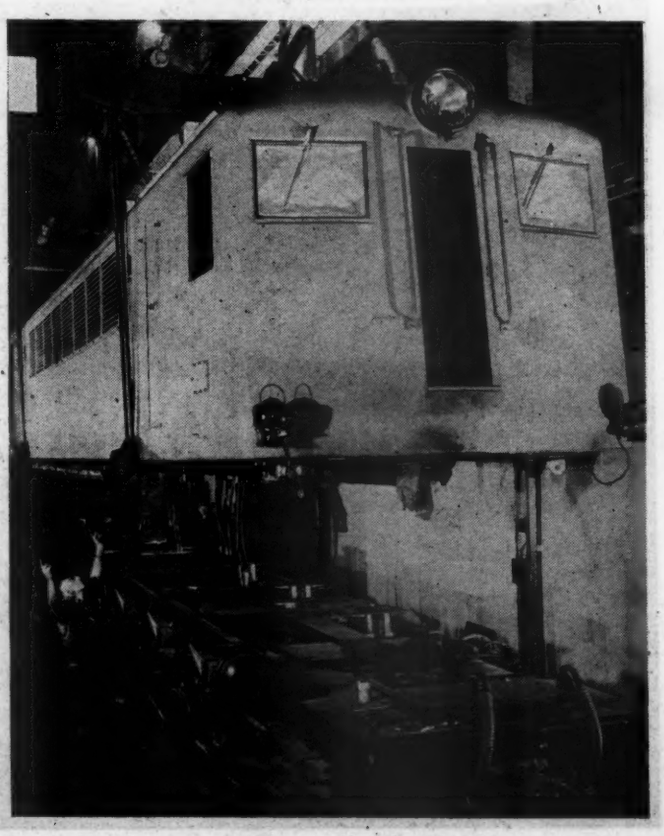
As for air-conditioning equipment, several years ago some preliminary tests were made in changing the exterior color of passenger cars, but nothing developed from these tests. Since the advent of lightweight cars, the colors have been changed to lighter shades of gray, blue, or aluminum, or stainless steel. With this change in color we find increased efficiency in our air-conditioning equipment.

Now that we have to operate every car possible, why not try and relieve some of the solar heat load on our older cars with canvas or steel roofs by repainting them from the heavy black to a light shade of gray or equivalent color that will act as a reflector rather than an absorber of the heat caused by the bright sunlight.

I am well aware that this will cost something, but I believe if it were computed against the operating cost of air-conditioning equipment it would pay for itself in a short time. There should be conclusive tests made under present-day conditions to ascertain how much change this would make in the capacity of the equipment on the cars and what improvement in temperature could be expected under heavy loads.

JOHN V. DOBBS,
Car lighting and air-conditioning inspector, Atchison, Topeka & Santa Fe, Albuquerque, N. M.

* * *



One of ten electric locomotives being furnished for the Estra De Ferro Sorocabana, Brazil, by the Westinghouse Electric & Manufacturing Company

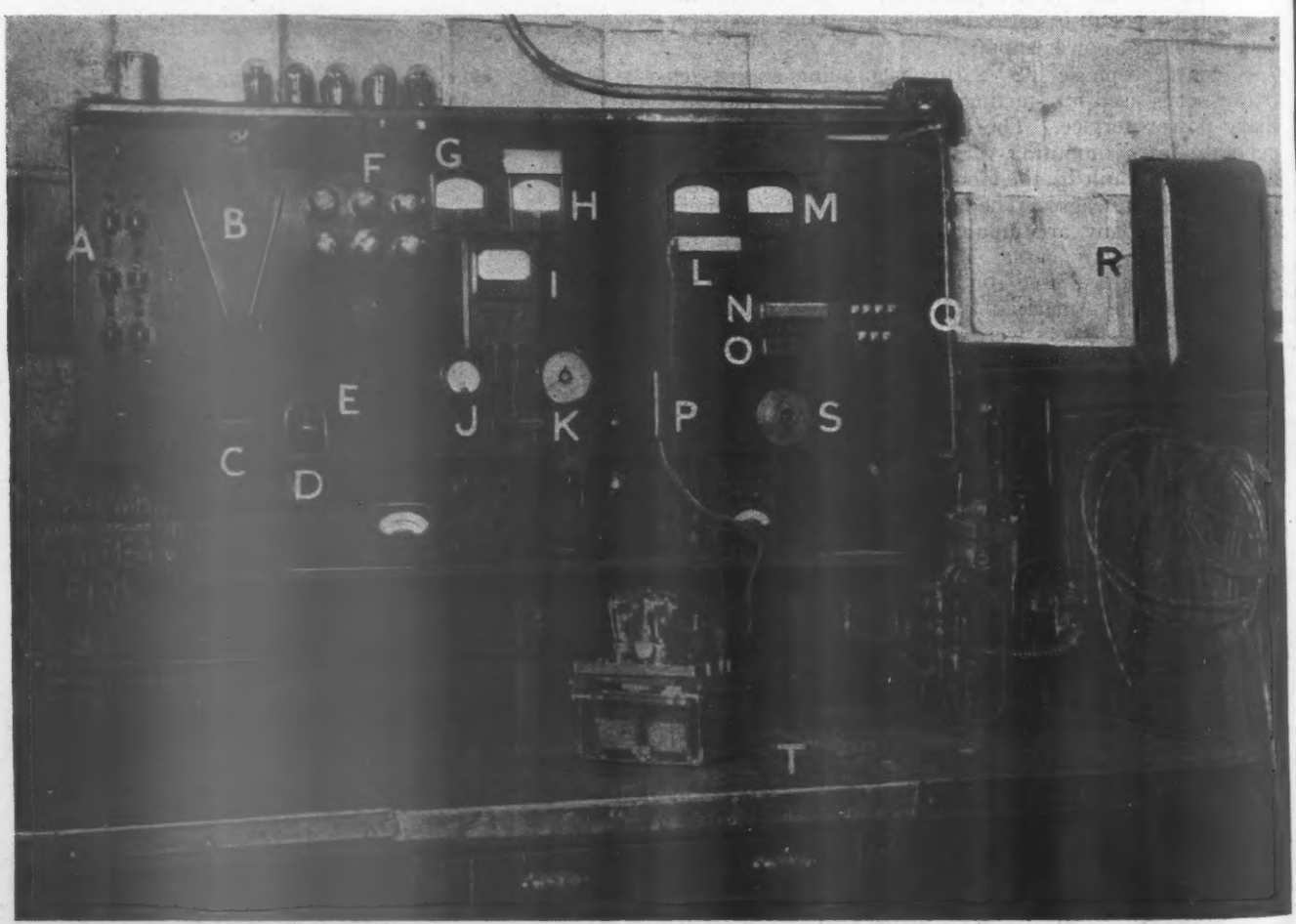
Multi-Purpose Testboard

The Boston & Maine Railroad has simplified the electrical testing required at an engine-house terminal by the use of an ingenious arrangement of circuits and instruments

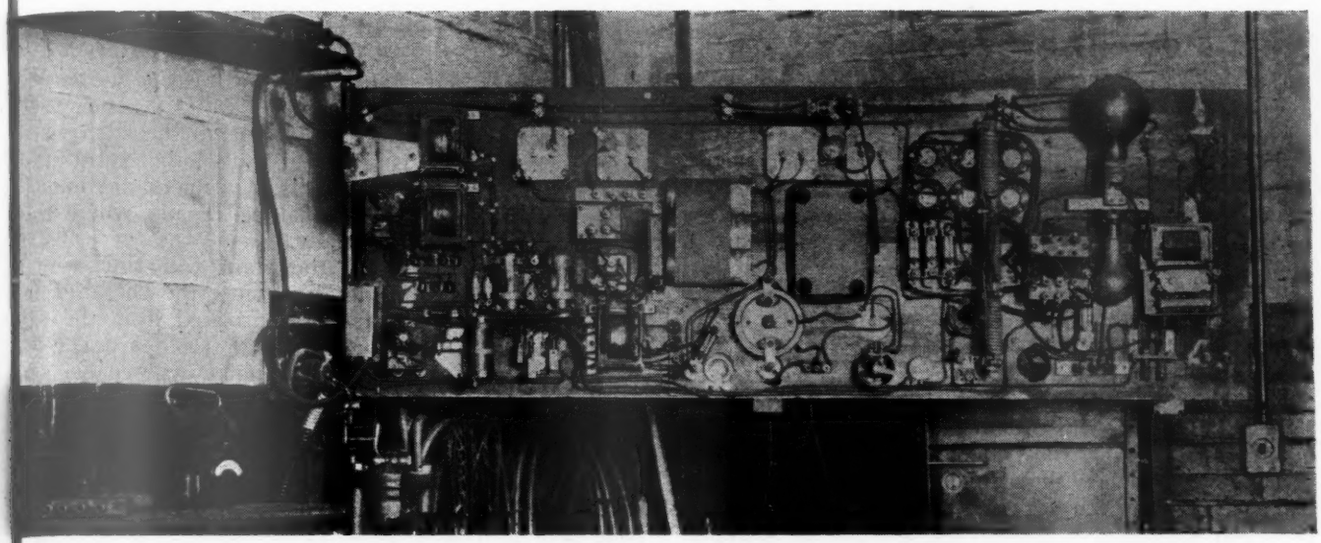
DRY battery charging, circuit testing, tube rejuvenation, a variety of field and resistance measurements and cab signal comparison tests are all accomplished quickly and easily on a testing panel used in the new terminal engine-house of the Boston & Maine Railroad at Boston, Mass.

The charging, or rather the reconditioning or rejuvenation of flashlight batteries is accomplished in the six clips at *A* on the switchboard. Dry cells placed in those clips automatically make contact, top and bottom, with the secondary of a Westinghouse trickle charger which will cause a current of from 125 to 300 mills to flow in reverse through the batteries. The value of the current depends on the number of batteries in the clips since the six sets of contacts are connected in series-parallel, in sets of two. The need for reconditioning is indicated by a decline in the brightness of the light. To check the condition of a battery a single cell is placed in series with a 16-ohm resistance and a milliameter. A fresh battery will give about 120 mills, and the usual procedure is to place them "on charge" when the current value drops to 75 mills. The charger will bring them back to a 120-mill output in from 20 minutes to an hour. This kind of treatment will extend the usual life of a battery about 50 per cent. It can be considerably further extended by daily reconditioning of five or ten minutes.

The two bars in the Vee arrangement at *B* are energized with 110 volts a.c. supplied from an all-purpose transformer having a number of secondary taps, and are used for testing fuses and other devices which can be placed easily between them. The same circuit is carried down to the receptacle at *C*. A portable cord from the plug extends the testing circuit to equipment placed on the bench. The receptacle has three sockets and the plug two prongs. By placing the plug in the center and left sockets a 100-watt lamp is connected in series in the test circuit. When the plug is moved to the two right-hand sockets there is a 1,000-watt lamp in the



A front view of the test panel showing the train-control amplifier under test



The test panel is hinged at one end and may be swung out from the wall to permit servicing of equipment on the back of the panel

socket to permit of greater current flow. The receptacle *D*, also in series with the lamps, serves to extend the test circuit to portable equipment which may be brought into the shop. The socket at left of *E* is connected in series-parallel with two 250-watt, 32-volt lamps and the 30-volt tap of the all-purpose transformer, and is used for locomotive lamp testing.

The amplifier tubes shown at *F* are PJ 2 and PJ 4 Pliotrons taking a 1.1-amp. filament current at 4½ volts. They are amplifiers for Union Switch & Signal uncoded continuous cab signals and are undergoing rejuvenation which consists of re-establishing the thorium coating on the filaments. The tubes brought in from the locomotives are tested for plate emission by connecting them in an a.c. emission test circuit with a milliameter and a 25-watt lamp in series with the plate. Exact values of filament current are obtained by a small rheostat shown at the bottom of the board below the right-hand lamps.

The instrument *G* is a milliameter used for measuring plate current and the instrument *H* is an ammeter for measuring filament current. For testing plate output a tube is placed in the socket at the right of *E*. This connects it with the filament and plate ammeters, and pressing a button below the socket applies plate voltage to the tube. If the output has fallen to 65 mills the tube is rejuvenated and brought back to 95 mills as a low limit. The procedure consists of "flashing" or applying 125 per cent of normal filament current for one minute without plate voltage, after which the filament current is reduced to 75 per cent normal and the tube is baked for a 24-hr. period. The required voltage applications are accomplished by the two rotary plug switches below the tubes. The cooking voltage on the tube sockets is .75 normal and this is raised to 1.25 normal by rotating each plug switch consecutively through three positions, which in turn shorts out fixed resistors wired in series with transformer and tube sockets.

The instruments *J* and *K* are ohmmeters. The one at the left is a Weston Model 301, zero to 100,000 ohmmeter, and the one at the right is a shop-made instrument measuring up to 30 ohms. These instruments are energized by three No. 6 dry cells and their circuits are carried out through a three-point receptacle at the lower center of the board to test prods by means of which resistance measurements are made on the bench.

The Weston farad meter Model 764 shown at *I*, the milliameter *L*, and the ammeter *M* are used for train-control-equipment tests. The amplifier *T* brought in for test is plugged into the board connections through the four-point plug and receptacle *P*, exactly as is done on the locomotive. The output which ordinarily goes to the cab signal relay circuit is carried to the milliameter *L* through a 16-ohm resistor which replaces relay coil resistance. Proper current values indicate correct operation of the amplifier.

For testing the several component parts of an amplifier, the receptacles *N* and *O* and the selector switch *S* are used. By plugging the amplifier *T* into the receptacle *N* and the output to *O* the selector switch may then be used for connecting panel amplifier parts known to be good in the place of those on the amplifier under test. These include a plate reactor, an output transformer, a rectifier, and stage connections. Under these conditions the part of the amplifier under test is disconnected. To make these tests possible there is a receiver bar under the bench. The selector switch permits 1½ or 5 amp. through a dummy rail circuit with the proper rheostat and meter in series. In this way each part is tested by comparison. The farad meter is used for testing condensers. It has a zero to 10 scale and a five-point switch by means of which the scale is divided by 1,000, divided by 100, divided by 10, is direct reading, or is multiplied by 10.

The necessary power for testing is supplied by a 32-volt d.c. headlight generator mounted on the ceiling and driven from the compressed-air line, and a 350-volt d.c. dynamometer also mounted on the ceiling and receiving its power from the headlight generator. The 32-volt power is brought to the panel through a headlight reactor for reducing the commutator ripple. There is one of these for the panel and one for the amplifier on test. The 350-volt power is also filtered by capacity and reactance, as used on the locomotive. The filtering equipment is mounted in the cabinet *R*.

Provision is also made for the testing of receiver bar circuits on locomotives, utilizing the panel-mounted amplifier. Wires are run to three enginehouse leads nearest the test panel and these are used to connect the receiver coils on a locomotive with the equipment on the panel. The push-pull switches at *Q* introduce capacities on the receiver circuit for tuning.

The test panel was devised by and made up under the direction of P. J. Hamman, Diesel-electric foreman, of the railroad.

Self-Propelled Train

A "three-in-one" passenger train, driven by a packaged electric power unit that can be quickly detached and replaced, has been designed by a Westinghouse engineer to provide faster, roomier and quieter service for postwar commuters.

Planned for maximum passenger space and easy maneuverability, the train will be made up of three articulated, or interlocking sections: a passenger car at each end and a compact, walled-off compartment in the center, containing a Diesel engine, electric generator and control equipment.

No overhead wires are necessary since the power package contains all that is necessary to furnish power for the electric motors which drive the train. Operator cabs at either end enable the train to be driven in and out of station terminals without involved switching delays.

The train has been designed by A. H. Candee, transportation engineer, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. He offers the following reasons for its application: "A train of this type will do much toward speeding up traffic in congested terminals. When a locomotive-hauled train enters a terminal station having dead-end tracks, it must be backed out and turned around, then backed into the station before it may be used for outbound passengers. This usually involves eight separate switching movements before the inbound train is ready for its outbound trip. But with a train containing its own driving power and with control compartments at either end, the number of movements is reduced to two in entering and leaving the station.

"The power unit of such a train can easily be removed for repairs. When the equipment shows signs of needing overhauling, the train is driven to the shop where the 'power package' is lifted out and another substituted. This will enable railroads to keep a maximum number of trains in service, while making repairs where they can be done most economically.

"Future passengers on the train will ride with a minimum of noise and vibration, since the Diesel engine and electrical equipment will be isolated from the passenger cars in a virtually sound-proof compartment. A walled passageway around the engine will enable passengers to move easily and safely from one car to another.

"Power can be drawn from the unit as it is needed. This means that besides driving the train, the power unit can supply all the electricity that is necessary for air-conditioning, modern lighting, air cleaning, water coolers and other electrically-operated conveniences. In addition, the power supply is increased in direct proportion to the number of units that are coupled, since each unit contains its own 'power package.' As a result, the train can travel at the same speed no matter how many cars are in the train.

"Many suburban passenger cars now operating on American railroads could be adapted to this type of train. The use of a separate power cab means that these cars need not be scrapped, but can be converted to self-propelled trains at a minimum expense."

CONSULTING DEPARTMENT

Roll-Out Battery Boxes

Would it be practicable to mount passenger-car battery boxes on rollers to permit drawing the batteries out for flushing, cleaning and inspection?

Disadvantages Outweigh Advantages

No doubt there are some advantages in having battery boxes so constructed that they can be rolled out for servicing and inspection of cells; but when all of the angles of this question are considered, the disadvantages of such an arrangement will probably outweigh the advantages. Some of the disadvantages are:

First, the problem of placing the battery in such a box or removing it from the box. The top of a roll-out box would be about 44 in. above the rail, which would mean lifting the trays vertically about 6 ft. and then lowering them into the box. This is certainly not a manpower job and would have to be done with a crane truck. This in itself would confine battery changes to yards equipped with such trucks.

Second, there is a very distinct possibility of damage to cells and trays when being handled with a crane truck, especially when fitting them into a box having close clearances such as we have today with large batteries in standard battery boxes.

Third, while the long connections inside the box could be eliminated, it would be necessary to provide one long exposed connection on each end of the box to permit its being pulled out. Such external leads would be where they could be easily damaged by flying rocks, etc.

Fourth, there is a problem of pulling out the battery box, especially when the entire battery is placed in one box. Batteries are normally flushed about every thirty days, at which time terminals and leads are checked. I seriously doubt the possibility of manually rolling out the box after it has accumulated dirt and rust for 30 days with the rolling mechanism in one position. Assuming that the rollers and track are in perfect condition, it would certainly be more than a one-man job to move the loaded box in and out. With our present boxes, especially those having horizontally split doors, it is a one-man job to flush and inspect any battery.

Fifth, there is the problem of trays sticking to the bottom of the box. There is no reason why tracks would not stick just as tight in a roll-out box as they would

Can you answer the following question? Answers should be addressed: Electrical Editor, *Railway Mechanical Engineer*, 30 Church Street, New York 7, N. Y.

Should passenger car roofs be finished in light colors to reduce the sun load on the air-conditioning systems? More detailed comments concerning this question are included in the letter which appears on page 307 of this issue under the title, "Some Services Should Be Improved Now."

n any box, and prying them loose is a much easier job n our present boxes than it would be in a roll-out box here there may be no way of using a pinch bar.

Everything considered, I do not believe the roll-out ype of box has much to offer except the possibility of loser terminal inspection.

L. J. VERBARG,
Air conditioning engineer,
Missouri Pacific

ractical Considerations Say No

There is no doubt that a roll-out box would offer cer-ain advantages such as those referred to in the April ssue of *Railway Mechanical Engineer*. However, there would be disadvantages which might, in our opinion, offset the benefits gained. Briefly these are as follows:

It would necessitate more help for flushing batteries.

In order to roll the battery out on rails, longer battery end connections or car leads would be required.

Under the present arrangement, batteries are flushed without waiting for trains to be made up. With a roll-out type of box, yard forces would have to be certain the car would be available for a longer period of time.

At least four rails would be required which would add weight to the car and would increase the length of the interbox connector between the two groups of four trays.

Roll-out boxes would increase maintenance and inspection costs as regards mounting arrangement.

To be practical, it would be necessary to roll the battery out beyond the side of the car, which would be difficult where batteries are now located under center sills.

K. F. NYSTROM,
Mechanical assistant, chief operating officer,
Chicago, Milwaukee, St. Paul & Pacific

Something for New Cars

Mounting is a practical idea that can be developed by car builders and engineers of car construction on new cars that are to be constructed after the war. When building of new cars was stopped by the war, some steps had been taken toward this feature by the extension of battery cable outside of the boxes. This eliminated the use of rigid conduit to the box to carry the battery wire.

I do not believe the expense would warrant such a change on cars already built unless they were of the latest type. The change on such cars could be accomplished after the redesign of hangers or suspension members of the battery boxes were developed for new cars.

The future of such an idea rests on the proposition as to whether such a development will cut down the servicing time of batteries in terminal yards to the extent that it will warrant the added expense of such an application when cars are built. The question is, will improved battery maintenance and the time saved in servicing batteries over a period of years compensate for the expense of development and application of the roll-out type of battery box.

If the boxes were developed so that they could be rolled out and a lift truck run under the box and the box with batteries fixed so that they were interchangeable, it would facilitate battery changes on streamline trains where the lay-over period is short and there is not ample time for battery charging. To do this it would be necessary either to carry an extra battery box or two on hand with extra sets of batteries so that they have the same capacity as those on such cars.

In my opinion, now is the time to develop this and all other such ideas so that when construction of new cars is started again such ideas can be incorporated in such cars.

J. V. DOBBS,
Car lighting and air conditioning inspector,
Atchison, Topeka & Santa Fe

Might Be Good for Batteries With Screw Filler Caps

Roll-out battery boxes may provide some convenience in the flushing of battery cells which have screw filler caps, but I do not believe the additional weight and expense would be justified where the boxes house cells having hinged filler caps which can be readily opened and closed with the filler nozzle.

C. P. TAYLOR,
Electrical engineer,
Norfolk & Western

Further Study Required

I believe that some method of facilitating battery service would be highly desirable. I think, however, that the roll-out type box would present mechanical difficulties which would require considerable study before the arrangement could be worked out in a way which would accomplish the purpose intended, and at the same time provide the necessary security.

WALTER B. DEAN,
Executive engineer,
Edward G. Budd Manufacturing Company

* * *

Mobile transmitter and receiving unit that will be used in the tests of high frequency radio in the operation of trains by the Baltimore & Ohio and the Bendix Aviation Corporation—The Federal Communications Commission has granted permits for the installation of transmitting sets

General Committee Approves

Mechanical Division Reports

R. G. Henley,
Acting Chairman

In session at St. Louis on June 23 and 24, it released work of thirteen committees prepared for discussion at cancelled membership meeting

A two-day annual meeting of the Association of American Railroads, Mechanical Division, for full membership attendance, scheduled for June 23 and 24 at the Hotel Jefferson, St. Louis, Mo., was postponed about two weeks in advance of that date. At that time it was hoped that conditions might permit calling this important gath ering of railway mechanical department officers at som later date in 1944. Uncertainty regarding the feasibilit of this plan, and particularly the need for prompt actio on a considerable number of committee recommendation bearing directly on more efficient equipment maintenanc and use under war conditions, resulted in a final de cision to give up all idea of a member meeting of th Division this year and, in lieu thereof, have the com mittee reports formally passed on and released prompt by the General Committee.

To accomplish this objective, the General Committe held its meeting on June 22 at St. Louis, as schedule for the consideration of the regular docket of Mechanica Division business, and extended the meeting to the nex day, June 23, when committee chairmen were invited t be present and submit their reports. Abstracts of the 1 committee reports and the action taken regarding eac are included in the following pages.

R. G. Henley, general superintendent motive powe Norfolk & Western, continues as acting chairman of th General Committee. Other members of the committe are W. H. Flynn, general superintendent motive powe and rolling stock, New York Central; C. B. Hitch, chie

A. C. Browning,
Secretary

V. R. Hawthorne,
Executive Vice-Chairman

W. I. Cantley,
Mechanical Engineer

echanical officer, Chesapeake & Ohio; O. A. Garber, hief mechanical officer, Missouri Pacific; H. W. Jones, hief motive power, Pennsylvania; J. M. Nicholson, assistant to vice-president, Atchison, Topeka & Santa Fe; P. O. Christy, general superintendent equipment, Illinois Central; H. B. Bowen, chief motive power and rolling tock, Canadian Pacific; A. K. Galloway, general superintendent motive power and equipment, Baltimore & Ohio; H. H. Urbach, mechanical assistant to executive vice-president, Chicago, Burlington & Quincy; B. M. Brown, eneral superintendent motive power, Northwestern Pacific, and J. Gogerty, general superintendent motive ower and machinery, Union Pacific. V. R. Hawthorne s executive vice-chairman of the Mechanical Division, nd W. I. Cantley, mechanical engineer.

Report on Car Construction

Lightweight Steel Sheathed Box Cars and Hopper Cars

The development of lightweight designs for general service box and hopper cars, making use of high-tensile, low-alloy steel, riveted or welded construction, in collaboration with the ARCI Freight Car Design Committee was necessarily deferred on account of the material situation, shortage of manpower, development of composite emergency car designs, and the volume of other important engineering matters to which the railroads and car builders were required to give preference in the furtherance of the war effort.

As the result of a special assignment, the ARCI is completing

Members of the General Committee

W. H. Flynn

C. B. Hitch

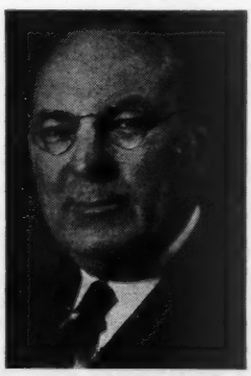
O. A. Garber

H. W. Jones

J. M. Nicholson

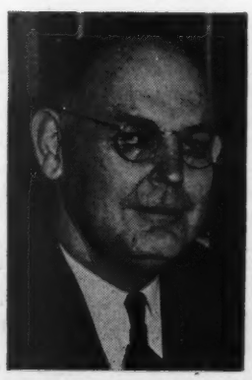
P. O. Christy

H. B. Bowen



A. K. Galloway

H. H. Urbach



B. M. Brown

the design of a lightweight merchandise car for high-speed service. This car is of the box type of high-tensile low-alloy steel, welded and riveted construction, having inside length of 50 ft. 6 in., inside width of 9 ft. 2 in. and inside height of 10 ft. 5½ in. The Committee on Car Construction is cooperating in the development of this design.

With the increased availability of aluminum, greater interest is being shown in the development of hopper-car designs using aluminum alloys with resultant reduction in weight and increase in pay load. To date, one complete design for 50-ton nominal-capacity hopper car of aluminum construction has been submitted for consideration under the provisions of Interchange Rule 3.

Composite Freight Cars

The 1943 Annual Report, Circular D. V.—1049 included the list of composite car designs, developed in collaboration with the Freight Car Design Committee of the American Railway Car Institute.

A design of 50-ton, composite gondola car with drop ends as shown on A.A.R. drawing No. 5623-B was subsequently added to the list of general dimensions as shown below:

Inside length, ft.-in.	48-6
Inside width, ft.-in.	9-2
Inside height, ft.-in.	3-0

As a result of requests from certain member roads who desired to deviate from the corner post construction and sheathing application at the side sill and side plate, as shown on general arrangement drawings for composite box cars, A.A.R. Plates 1550 and 1551, covering 40-ft. 6-in. and 50-ft. 6-in. cars, respectively, alternate arrangements were developed and circulated to member roads and car builders with the Executive Vice-Chairman's letter of Sept. 9, 1943:

(a) A.A.R. sketch dated 8-11-43 showing W section corner post, with 2-in. by 2½-in. by ¼-in. angle, for attachment of sheathing, as a substitute for Z-bar corner post.

(b) A.A.R. Plate No. 1572, showing modified application of sheathing and flooring at the side sill, and sheathing at the side plate.

The alternate arrangements, which involve the use of some additional steel, were approved by the War Production Board as substitutes for the construction shown on the A.A.R. plates.

Specifications and drawings will be prepared covering the recommended manner of converting composite cars (particularly box and hopper) to all-steel construction at some future time when necessary materials are available.

Victory Cars

The composite car designs were continued as emergency standards until the latter part of 1943 when changes in the steel situation permitted reversion to all-steel construction to a limited extent, with the stipulation that the designs would be modified to reduce the amount of plates and sheets used. For this study, A.A.R. Standard and Accepted Designs were used as a basis, all concerned being in agreement that for cars of riveted open-hearth steel construction, these designs represent the most economical and efficient use of materials and any reduction in the thickness of plates or sizes of shapes would be at the sacrifice of strength and service life, therefore any saving in the amount of steel used would be accomplished through the substitution of rolled shapes for plates and sheets where this could be done without detracting from the strength or serviceability.

The resulting designs designated as Victory cars, after approval by the War Production Board, were released to member roads by President J. J. Pelley, under dates of Jan. 28 and Feb. 12, 1944, and are intended to be followed until the material situation is further relieved.* General arrangement, A.A.R. Plates 1500-D and 1501-D, are modified by substitution of longitudinal steel floor stringers between bolster and end of car as shown on A.A.R. Plate 1-1542 in lieu of diagonal braces.

Troop Cars

The committee reported that the last of the 1,200 troop sleeping cars built by the Pullman-Standard Car Manufacturing Company and the 400 kitchen cars built by the American Car and Foundry Company, were completed in March and April, 1944.†

The emergency sub-committee and other members of the Committee on Car Construction were continually in touch with the design and building of these cars and a number of special conferences with the builders and representatives of Defense Plant Corporation, War Production Board, Office of Defense Transportation, and others, were held, including inspections and trial runs of sample cars. The emergency sub-committee also participated in the formulation of instructions governing the operation of these cars and the special equipment and facilities which it was necessary to provide.

Freight Cars Ordered May 1, 1943, to May, 1, 19

Since 1936 your committee, each year in its annual report, has made a statement of the freight cars ordered during the preceding year. Sufficient detail is given in these statements to indicate the extent to which the members were following A.A.R. standardization for these cars.

An analysis of the box and hopper cars is presented in the table

Box, Auto-Box and Hopper Cars Ordered May 1, 1943 to May 1, 1944, Classified According to Their Relation to A. A. R. Standards

A. A. R. throughout:	
Box and auto cars	10,550
Hopper	8,385
A. A. R. throughout except for variations in dimensions:	
Box and auto	3,405
Hopper	100
A. A. R. composite emergency designs:	
Box and auto	2,025
Hopper	3,520
A. A. R. composite emergency designs, except variations in dimensions:	
Box and auto	1,050
Hopper	....
A. A. R. throughout, except floating center sills:	
Box and auto	500
Hopper	1,000
Non A. A. R., except 25¾ in. truck height:	
Box and auto	....
Hopper	3,100

* Dimensions also vary from standard on these cars.
** 2,900 of these cars also have the standard center-sill section.

In addition to the above cars, 640 refrigerator cars were ordered during the same period. One hundred are A.A.R. standard and 340 more include the Z-section center sills and trucks with 25¾-in. center-plate height.

Of the 5,590 gondolas ordered during the same period 2,67 are of the A.A.R. emergency designs, and an additional 1,635 o non A.A.R. emergency design have the standard Z-section center sills and truck-center plate heights of 25¾ in. Of the remainder 1,000 have floating center sills.

Of the 1,258 flat cars ordered during the period 1,050 were o the A.A.R. emergency design and the truck center plates of th remainder were 25¾ in. high.

Orders were placed for 100 stock cars and 775 other cars o special types. All of the former were built with standard Z-section center sills and 25¾ in. center-plate height. Of the latter 275 had the standard center-plate height.

Side Frames and Bolsters

During the past year two new designs of side frames and three new designs of bolsters have been approved for use in interchange service.

One additional application for approval has been received and this application is still pending. It covers an inboard roller bearing design of high-speed truck, Grade B carbon steel, 50 tons capacity, offered by Timken Roller Bearing Company. Otherwise the list of applications pending remains the same as reported last year. Most of these pending applications continue to be s classified because the manufacturers, for various reasons, have not been ready to proceed with tests.

Waste Retainer Ribs in Journal Boxes

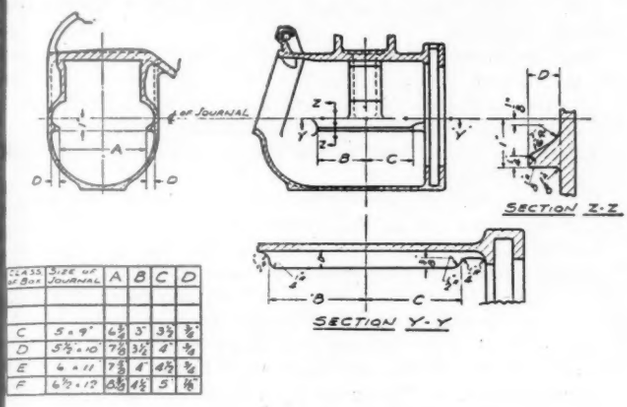
Application of waste retainer ribs as shown in 1943 annual report was adopted as standard practice by letter ballot. Subsequent investigations indicated the desirability of making some modifications in the dimensions of these ribs to avoid contact with any part of the axle under certain operating conditions

* A list of the so-called Victory cars was published in the *Railway Mechanical Engineer* of March, 1944, page 145.

† The troop sleeping cars were described in the October, 1943 *Railway Mechanical Engineer*, page 450; the kitchen cars, in the December, 1943, issue, page 579.

These modifications which are shown by the accompanying revised drawing, consist of reducing the dimension B for boxes of all sizes by ½ in. and for the Class F 6½-in. by 12-in. box, changing dimension A from 8⅛ in. to 8⅝ in. and dimension D from 1⅛ in. to ⅞ in.

All A.A.R. journal-box drawings, both integral and separate



CLASS OF BOX	SIZE OF JOURNAL	A	B	C	D
C	5 × 9"	6½	3"	3½	⅝
D	5½ × 10	7⅛	3½	4"	⅞
E	6 × 11	7⅝	4"	4½	⅞
F	6½ × 12	8⅛	4½	5"	⅞

Revised dimensions of waste-retainer ribs

types, now included in the Manual, are being revised to incorporate the waste retainer ribs. In view of variations in the overall widths of boxes, dimension A for the respective journal sizes will be adhered to and dimension D modified to suit the width of box in each case.

Brake Beams

This subject is now under the jurisdiction of the Committee on Car Construction and the sub-committee appointed to handle all matters pertaining to brake beams and their suspensions submits the following recommendations:

1—Change the distance, center to center, of brake heads from 60 in. minus ¼ in. plus 0 to 60 in. plus ¼ in. minus 0. This will require revision of Section III, Para. (a) of the Specifications for Repairs to Freight Equipment Brake Beams to read: "* * * must not be less than 60 in. nor more than 60¼ in." *Reason:* To decrease lateral pressure between flange of wheel and brake shoe, with resultant decrease in wear on flange of wheel and toes of brake head and reduce lateral strains on brake beam and suspensions.

2—Change width of brake-shoe key slot in brake head from 1⅛ in. plus 1/64 in. minus ⅛ in. to 1 1/16 in. plus 1/64 in. minus 1/16 in. The gage shown on page B-10-1940 of the Manual is to be changed to suit. *Reason:* To decrease lateral motion between shoe and head and transfer part of the force from the shoe to the key instead of on the toes of brake head also to reduce wear.

3—(a) Change A.A.R. brake shoe gage shown on B-12-D-1938 to include a no-go portion for gaging, the width of the brake shoe end lug, limiting the width at the bottom to 1 13/32 in. *Reason:* Present drawing gives no minimum dimension. Lateral motion between shoe and head should be controlled.

(b) Change the taper of brake shoe end lugs to agree with the taper of the head. *Reason:* To provide uniform bearing, entire depth of lug.

(c) Change A.A.R. brake head gage B-10-1940 to include a no-go portion for limiting the maxium distance between brake head toe walls to 1 11/16 in. at the top and 1 3/16 in. at the bottom. *Reason:* To reduce lateral motion between brake head and brake shoe.

4—Change the end stops on the brake shoe engaging with the top and bottom brake-head toes from 9/16 in. to ⅞ in. high. *Reason:* When the brake head was last revised, the bearing surface on the toes was increased but the end stops on the brake shoe were not changed to correspond.

5—Eliminate the alternate design of cross section at center of brake shoe. *Reason:* The projection at the center will wear on the flange of the wheel and decrease the lateral motion of the brake beam.

6—Change the dimensions of the gage for the strut-pin hole shown on page B-12-A of the Manual as follows: On no-go end from 1 5/32 in. plus .005 minus .000 to 1 3/16 in. plus .002, minus .002, and on "go" end from 1 3/32 in. plus .000, minus .005, to 1⅛ in. plus .002, minus .002. *Reason:* Pins made from 1 3/32-in. stock will not fit in 1 3/32-in. hole.

7—Change the radius on the ends of the pads on the back of the brake shoe, top and bottom, from 9/16 in. to ⅛ in. *Reason:* To square this surface and provide bearing area for contact with the brake-head-toe tie bar.

Welding of Truck Side Frames and Bolsters

Upon instructions from the Committee on Car Construction and in Mr. Browning's letter of August 5, 1942, a special subcommittee on Welding of Truck Sides and Bolsters undertook to determine, through tests of welded cast-steel truck side frames, if the present limitation of welding cracks and fractures only when the area of crack is less than two-fifths of the area through the section at the point of fracture, as now covered by Rule 23, page 93, of A.A.R. Code of Rules, can be extended to 100 per cent fractures, welds to be performed by either the shielded-arc electrode or oxyacetylene process.

New U-section 50-ton cast-steel truck side frames, all of the same pattern, cast from the same heat and annealed at the same time, were used for these tests in order to secure comparable results. The pattern selected was one which had been previously subjected to dynamic fatigue tests.

Twelve new side frames, New York Central pattern F-6788, Symington-Gould pattern TF-5205, were selected for this test and purchased from the Symington-Gould Corporation. Examination of results of previous dynamic fatigue tests of this frame pattern showed that the weakest section was the left tension member approximately as the point where the bracket joins the journal box and tension member, and accordingly all welds in the test frames were made at this location. Six of the test frames were given 100 per cent fractures and six were given 40 per cent fractures at this location, and these frames were welded as follows:

1 frame 40 per cent weld, oxyacetylene Oxweld
1 frame 40 per cent weld, oxyacetylene Airco
2 frames 100 per cent weld, oxyacetylene Oxweld
2 frames 100 per cent weld, oxyacetylene Airco
3 frames 40 per cent weld, electric
3 frames 100 per cent weld, electric

The oxyacetylene welds were all made at the New York Central reclamation plant at Ashtabula, Ohio. Oxweld welding wire No. 32 was used on three of the frames and Airco welding wire No. 1 was used on the remaining three frames. The electric welds were made at the Erie reclamation plant at Meadville, Pa., all with Lincoln Electric Company's Fleetweld No. 3 electrode.

After welding, the frames were normalized in a car bottom furnace equipped with pyrometers by slowly and uniformly heating the castings to a temperature of from 1,500 to 1,600 deg. F., allowing two hours to bring to this temperature, and then holding at this temperature for a period of 1 hr. 30 min. The car bottom was then withdrawn from the furnace and the castings allowed to cool in still air protected from strong draft or rain. Tram measurements were taken from each side frame at the front, bottom and rear of the left tension member before the frames were cut through the section, after being cut, after welding, and after normalizing.

After the side frames had been normalized, they were returned to the Symington-Gould Corporation, Depew, N. Y., where the frames were sandblasted to remove all normalizing scale and subjected to a dynamic fatigue test under the observation of a representative of the joint sub-committee.

The first frame tested failed through the right tension member at 187,182 loadings through a crack at this location which developed at 138,600 loadings.

The next eight frames failed through transverse cracks in the top of either the right or left journal-box roof at the junction of the journal box and tension member at varying loadings.

The original welds were not disturbed or affected by any of these ten tests and it was decided to have the cracks which developed in four of the 100-per-cent weld frames, including the critical cracks at the junction of the journal box and tension member, welded and the frames returned for further dynamic fatigue tests. Accordingly, Frame Serial 1944, Test 210-F-283, and Frame Serial 1945, Test 211-F-281, were sent to the New York Central reclamation plant at Ashtabula where the cracks were

welded by the oxyacetylene process, using Oxweld No. 32 welding wire. Frame Serial 1941, Test 202-F-282 and Frame Serial 1949, Test 204-F-284, were forwarded to the Erie reclamation plant at Meadville where the cracks were welded by the electric arc process, using Fleetweld No. 5 electrode. After the welding was done all frames were normalized according to the schedule above referred to and the frames returned to Depew, N. Y., for further tests.

Frame 1945, Test 214-F-285 (second test number), failed in final test through a crack developed at 72,300 loadings at the junction of the left-hand tension member and the journal-box roof; the test was discontinued at 170,254 loadings. In the first test this frame failed at the junction of the right-hand tension member and journal-box roof.

The first critical cracks in Frame 1941, Test 215-F-286 (second test number), and Frame 1949, Test 216-F-287 (second test number), developed in the right bolster columns at 108,500 and 165,000 loadings, respectively, and the tests were discontinued at 212,524 and 193,440 loadings, respectively, without complete failure of frames. Frame 1944, Test 213-F-288 (second test number), developed its first critical crack in the front wall of the right-hand tension member at 129,400 loadings and the test was discontinued at 230,060 loadings without complete failure of the frame.

In all, thirteen dynamic fatigue tests were made and in no case did any failure occur through the welds, though in test 213-F-288 a crack developed at 129,200 loadings in a slight depression adjacent to the weld on the back flange of the left-hand tension member but had no depth and progressed only ½ in. during the remainder of the test.

Recommendations

In view of the results of these tests, it is recommended that:

1—Interchange Rule 23, page 93, be revised to permit welding of cracks, regardless of length or depth, or fractures in any U-section cast-steel side frame which bears a casting date later than 1926. The physical test requirements of A.A.R. side-frame specifications were increased approximately 50 per cent in 1926, and it is our opinion that the present limits should apply to all of the older designs.

2—Welding may be performed by either the shielded-arc-electrode electric process or the oxyacetylene gas process. For welds made by the oxyactylene process the welding wires used shall be Oxweld No. 32 or Airco No. 1 or equivalent.

3—In the preparation of frames for electric arc or oxyacetylene welding the oxyacetylene gouging nozzle shall be used, and the frame sections to be welded shall be preheated.

4—After welding, side frames must be normalized in a furnace, using pyrometers or other satisfactory temperature measuring devices, by slowly and uniformly heating the casting to a temperature of from 1,500 to 1,600 deg. F., allowing at least two hours to bring to this temperature, and holding casting at this temperature for from 1 hr. 30 min. to 2 hrs. The casting should then be removed from the furnace and cooled in still air, protected from strong drafts, rain or snow. In no case should any casting be quenched in water or other liquid medium.

5—All side frames reclaimed by welding must be legibly stamped in accordance with Section A, General Regulations, Paragraph 7.

NOTE.—Detail data on which the above report is based is available in the office of the secretary of the Mechanical Division.

With the acceptance of the above report the Sub-Committee on Welding recommends that the following modifications be made in the Regulations and Limits for Fusion Welding and Bronze Welding:

SECTION B, CAST-STEEL TRUCK SIDES—PAGE L-8 OF THE MANUAL

Proposed Form.—Building up worn surfaces and the welding of cracks or fractures at any location is permissible regardless of extent of section failure provided the frame is of U-section design and was manufactured, as indicated by foundry marks cast on same, later than 1926.

Weld material used for either the oxyacetylene or electric arc process must conform to Section B, Paragraph 2; and preparation of cracked sections for welding must be made by use of the oxyacetylene gouging nozzle to form a U-groove preparation.

Sections must be preheated before welding is started and normalized after welding has been completed, in accordance with Section A, Paragraph 6, and legibly marked in accordance with Section A, Paragraph 7.

Only regular qualified welders of record must be permitted to perform this work.

Heat treatment is not required for welding performed within the shaded area shown in Fig. 14.

Effective as of date specified in Interchange Rule 23, the building up of worn surfaces and welding cracks or fractures will be prohibited on truck sides having T- or L-section compression or tension members.

If the foregoing is approved by letter-ballot action, corresponding modifications will be incorporated in Interchange Rule 23.

Due to the fact that a great deal of difficulty is experienced in deciphering welders' identification marking required on truck side frames, bolsters and couplers, it is recommended that Paragraph 7 of Section A of the Welding Regulations be modified by the addition of the following wording: "surface of part to be smoothed off by grinding or other means before stamping."

If modification of Paragraph 7 of Section A of the Welding Limits and Regulations is approved, it is recommended that Paragraph (gi-9) (couplers and yokes) of Section C of Interchange Rule 23 be similarly modified.

It is believed that periodic normalizing of cast-steel truck side frames and bolsters in service under freight equipment cars when undergoing heavy repairs, would be of material benefit from the standpoint of increasing the service life of these parts. This is submitted for further consideration of interested Mechanical Division committees.

Rule 3—New Designs of Freight Cars

During the period May 1, 1943, to May 1, 1944, the following designs of freight cars have been reviewed in accordance with the provisions of the first paragraph of Interchange Rule 3 and approved for interchange service.

Defense Plant Corporation: Design of well-type flat car, similar to design built some time ago by the Pennsylvania: Total number of designs, 1; total number of cars, 8.

Submissions to Committee on Car Construction account tank-car applications subsequent to tabulation dated May 1, 1943:

American Car and Foundry Company: (Application No. 3918) construction of car structure, including anchorage, to be used for transporting 15 one-ton chlorine containers: Total number of designs, 1; total number of cars, 5.

American Car and Foundry Company: (Application No. 3963), construction of car structure, including anchorage, to be used for transporting 15 one-ton chlorine containers: Total number of designs, 1; total number of cars, 1.

Definitions and Designating Letters for Cars

The following definition and designation is submitted for a new type kitchen-pantry car:

DKP—A car provided with facilities for cooking and preparing food for passengers, the food to be served outside the car. The car may be one of a group operated articulatively with trucks common to the group.

The report was signed by E. P. Moses (acting chairman) engineer rolling stock, N. Y. C.; R. B. Winship, mechanical engineer, Can. Pac.; J. McMullen, consulting engineer, Erie; R. D. Bryan, mechanical assistant, A. T. & S. F.; J. A. Gower, assistant mechanical engineer, Pennsylvania; W. A. Pownall, assistant to general superintendent motive power, Wabash; C. A. Jordan, acting engineer car construction, C. & O.; L. H. Kueck, assistant chief mechanical officer, Mo. Pac.; J. K. Peters, mechanical engineer, D. & R. G. W.; H. L. Holland, engineer car construction, B. & O.; L. R. Schuster, engineer car construction, Sou. Pa.; T. M. Cannon, engineer car construction, C. M. St. P. & P., and F. J. Jumper, general mechanical engineer, U. P.

The report was accepted with the exception of the proposal to eliminate the alternate design of brake-shoe in the section of the report on brake beams, which will, therefore, not be submitted to letter ballot.

Further Development of The Reciprocating Locomotive

The activities of your committee since the last meeting of the Association have been confined largely to counterbalance tests of locomotives for high-speed service, which resulted from road tests recommended and sponsored by this committee in conjunction with the Committee on Relations between Track and Equipment, the Committee on Locomotive Construction, and the Committee on Locomotive Counterbalance Standards. The results of these tests are covered in a joint report of these committees, and will be available to the member roads about July, 1944. The Manual of Recommended Practice for Counterbalancing Locomotives is being rewritten to embody the information gained from the study of the test data obtained through road tests, and the revised Manual of Recommended Practice will be available the latter part of 1944.

There is a great deal of development work being carried on by the individual railroads, and your committee has closely followed these developments, but on account of other urgent work, has been unable to get together to make formal investigation and render a report.

1—Study of existing locomotives and improvements in counterbalance that can be made by application of results now available from recommendations shown in counterbalance manual.

2—Improved cylinder design to effect economy in the use of steam, and increased capacity of existing locomotives.

3—Improved performance resulting from poppet valve applications.

4—Improved drafting of locomotives.

5—Improved combustion of locomotives having to do with over-fire air, design of locomotive fireboxes and grates, and pulverized coal.

6—Improved materials that are, and will be available for locomotive construction.

7—Improved availability for service of new, as well as existing locomotives.

One of the major locomotive developments under way is on the Pennsylvania, with the 4-4-4-4 type four-cylinder passenger locomotives, which are capable of handling 880 trailing tons at 100 m.p.h. on level tangent track. The results of tests and development of this power will be studied by your committee during the coming year.

The report was signed by J. M. Nicholson (chairman), assistant to vice-president, A. T. & S. F.; W. I. Cantley (vice-chairman), mechanical engineer, Mechanical Division, A.A.R.; W. R. Hedeman, engineer tests, B. & O.; J. E. Ennis, engineering assistant, N. Y. C.; C. K. Steins, mechanical engineer, Pennsylvania; Lawford H. Fry, director of research, The Locomotive Institute; A. J. Townsend, mechanical engineer, Lima Locomotive Works, Inc.; R. P. Johnson, chief engineer, Locomotive Division, Baldwin Locomotive Works; J. E. Davenport, vice-president engineering, American Locomotive Company, and E. G. Bailey, vice-president, Babcock & Wilcox Company.

The report was accepted.

Report of Committee on Wheels

The practice of some foundries and car building plants in grinding the tread surface of cast-iron wheels prior to mating has resulted in conflict between the tape size cast on the back plate and the stencilled tape size on the front face of the wheel. The manner in which confusion arises is obvious when the mating of wheels is checked by inspectors since it would not be unlikely to find wheels correctly mated as to the tape size stencilled on the outside of the wheels while the as-cast size might be different. It is quite possible that, in grinding chilled wheels that have been in service, the white stencilled tape size may have disappeared and the as-cast size offers the only remaining indication of the depth of the chill.

The committee calls attention to the fact that it is essential that the original as-cast tape size markings should not be altered and if in the process of mating wheels there is difference between the as-cast and stencilled markings, the mating should be performed with respect to the stencilled tape size.

Instrumental Determination of Chill

This subject has previously been referred to in the 1941 report and information now develops that the instrumental process of determining the depth of the chill is, with the exception of one plant, in use in all foundries in the United States which have AMCCW inspection. The report points out that the use of instruments for chill determinations lends itself to the examination of an entire day's heat to a greater extent than it would to a specific lot of wheels being shipped to an individual customer.

The report suggests that this method has progressed to such point that it should be given recognition in the A. A. R. specifications for cast-iron wheels and that during the coming year the subject will be advanced along this line.

Cast-Iron Wheel Design

In the 1943 report under this topic, attention was directed to the request of the cast-iron wheel manufacturers, as represented by their association, to increase the outside rim thickness of the 750-lb. wheel from 1⅞ in. to 2⅛ in.

A similar request has been received to increase the rim thickness of the 850-lb. wheels from the 2¼-in. rim thickness given this wheel in 1940 at the time the weight of wheels for 70-ton cars was changed from 825 lb. to 850 lb. The manufacturers consider an additional ⅛ in. rim thickness can be applied to

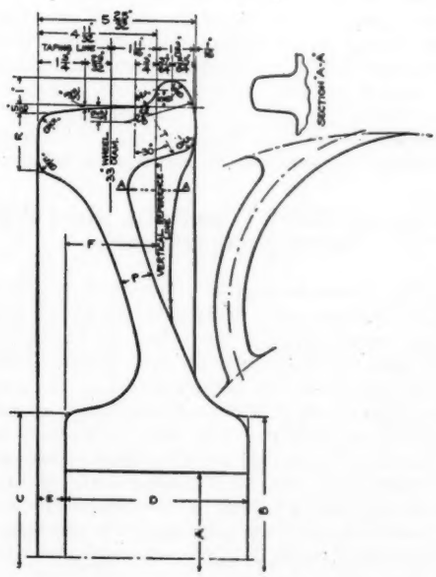


Fig. 1—Dimensions of Single Plate Bracketed Wheels

Car Capacity, ton	30	40	50	70
Nominal weight, lb.	650	700	750	850
Core size A, in.	5⅛	6	6½	7⅛
Hub diameter, back, B, in.	9¼	10⅛	10¾	11½
Hub diameter, front, C, in.	9½	10¼	10¾	11½
Length of hub, D, in.	6⅜	6⅜	6⅜	7⅜
Front hub recess, E, in.	1	1	1	1⅛
Vert. ref. line to front hub, F, in.	3 11/32	3 11/32	3 11/32	3 7/32
Thickness of plate, P, in.	1⅛	1	1 9/16	1 11/32
Thickness of rim, R, in.	1⅞	1⅞	2⅛	2⅜
Thickness through throat, T, in.	2	2	2⅛	2 25/32
Number of curved brackets	None	12	13	14

the 850-lb. wheels and not exceed the present weight limits of the 850-lb. wheel.

The committee approved this recommendation with the understanding that the wheels thus cast will have the letter *H* cast on the wheels in line with and 2 in. beyond the serial number.

It was recommended that the rim thickness for the 750-lb. and 850-lb. cast-iron wheels be increased to 2⅛ in. and 2⅜ in., respectively, with the understanding that the change becomes effective March 1, 1945, in order to allow all manufacturers

sufficient time in which to make the necessary pattern changes.

The committee recommended that this change in design should be submitted to letter ballot and if approved by the Association, Fig. 1 on page 8 of Specification M-403-41 should be revised as shown in the drawing.

Failure of Single-Plate Wheels

Because of the failure of 700- and 750-lb. cast-iron wheels of single-plate design, the committee believes that some limitations should be set up to discourage the use of single-plate non-bracketed wheels. With this end in view a questionnaire has been sent out to 35 roads with the object of collecting data on the relationship existing between failures of non-bracketed wheels and bracketed wheels of the single-plate design as indicated by the number of each being removed for defective conditions. The information developed by this questionnaire will be a matter of study by the committee before recommendations are made.

Reclamation of One-Wear Wrought-Steel Wheels

Conforming with the recommendations contained in the Wheel Committee's report of 1943, Rule 98 was revised so that paragraph (i-5) provides when one-wear wheels are turned to multiple-wear contour on account of flange wear or due to being slid flat, the markings on the wheel shall be changed to read 1-WT. Such wheels are to be charged or credited on actual service metal basis.

Paragraph (i-4) of the same rule permits the turning of one-wear wheels removed on account of built-up tread or out-of-round. This presents the question as to the proper charges and credits as well as the markings on such wheels after turning.

It was the opinion of the committee that all one-wear wrought-steel wheels turned to the multiple-wear contour for any reason, should be marked 1-WT; and that one-wear wrought-steel wheels ground or turned and the one-wear contour retained should not be marked 1-WT.

This question, as well as the subject of charges and credits, was referred to the Arbitration Committee for further handling.

The Use of Older Type 36-In. Steel Wheels In Passenger Service

A report by a member road of a failure, in passenger service, of a 36-in. multiple-wear wrought-steel wheel manufactured prior to the introduction of controlled cooling after forming gave rise to the suggestion that all such wheels should be prohibited from application to passenger cars. A study of this subject by the committee with representatives of the wrought steel wheel industry indicated that such failures, as reported by this road, have not necessarily been confined to wheels produced before the practice of controlled cooling was established. The opinion of the committee is that the establishment of a prohibitory rule would only serve as a hindrance in the maintenance of equipment and not contribute to the elimination of wheels which might fail.

The subject was considered of sufficient importance to warrant further study and a sub-committee was appointed for that purpose.

Wheel-Mounting Diagrams

Attention has been called to the fact that in neither paragraph 238 nor Fig. 116 of the Wheel and Axle Manual is there any mention made as to pressure fit limits as indicated by the wheel-mounting chart.

In considering mounting diagrams, attention has been confined principally to the character of the pressure line. This portion of the diagram has been recognized as the proper index as to good wheel-mounting practice.

The length of the pressure fit has been of secondary importance since with a satisfactory pressure line a likewise satisfactory length of pressure fit will be obtained. Then, too, any lost motion or irregularities in the attachments to the recording gauge that shows the length of the pressure fit would influence the length of this line to some extent.

Since the question has been raised, the committee has investigated conditions in shops and while this investigation showed there was considerable variation in the recorded length of the pressure fit with respect to the length of the wheel hub in the various shops, it was realized there should be some latitude provided for indicated length of pressure fit. The committee has recommended that this should be in the neighborhood of 93 per cent of the hub length of the wheel.

Wheel Shop Practices

The program of this committee to encourage better wheel shop practices has been carried forward and wheel shop inspections by the general mechanical committees have indicated that the work of the Wheel Committee along these lines has served to improve conditions.

The association has appointed a qualified inspector to give his attention to work of this character.

The report was signed by H. W. Coddington (chairman), research and test engineer, N. & W.; D. Wood (vice chairman), engineer of tests, So. Pac.; E. E. Chapman, mechanical assistant, A. T. & S. F.; W. R. Hedeman, engineer of tests, B. & O.; J. Matthes, chief car inspector, Wabash; F. Holsinger, wheel shop foreman, I. C.; A. M. Johnsen, engineer of tests, Pullman Company; E. C. Hardy, assistant engineer, N. Y. C.; A. G. Hoppe, assistant to mechanical assistant to chief operating officer, C. M. St. P. & P.; H. H. Haupt, general superintendent motive power, Pennsylvania, and C. B. Bryant, assistant to vice-president, Southern.

The report was accepted and necessary items referred to letter ballot.

Report on Locomotive Construction

Development and Use of Oil-Electric Locomotives

The development and use of oil-electric locomotives is now being handled by a sub-committee which, in order to coordinate the efforts of the Mechanical Division and Electrical Section, now includes two members from the Electrical Section. This sub-committee for the past two years has been studying various mechanical features which are common to most of the Diesel electric switching locomotives now in service; the purpose of these studies to bring about standardization of parts. Up to the present time the studies have been devoted to truck designs. Some progress has been made in spite of the war conditions and it is expected that concrete recommendations can be presented in our next report.

The 1941 report of this committee included statistics on the assignment and cost of operating oil-electric locomotives. The work of assembling and reporting this information was temporarily discontinued with the 1941 report because it appeared that all information on the subject available up to that time had been obtained and reported; however, during the last three years the use of oil-electric locomotives has been greatly extended both with reference to the number of locomotives in service and the classes of service performed. The number of roads using motive power of this type has also increased. It is believed that further valuable data on this subject can now be obtained and it is our intention to include more information of this kind in our next report.

There are also in progress of design or development several new types of locomotives which will be powered by new prime movers such as steam or gas turbines. We expect to keep in touch with these developments and report all information of value pertaining to them.

Design of Fundamental Parts of Locomotives

Dry Pipes and Steam Pipes: In 1943 there was submitted to letter ballot for adoption a list of sizes of steel or iron tubing to be used for making dry pipes of steam locomotives. In continuance of its work on this subject, the committee expects to compile a list of standard sizes of tubing suitable for dry pipes

locomotives having front end throttles, this list to be ready for submission in the next report.

Boiler Supports—Waist Sheets: In 1940 the committee included two drawings of center boiler supports showing all other waist sheets or supports eliminated between the frame and the boiler. These two styles have given satisfactory service; locomotives equipped with Style 2 support have completed 6,427,867 miles and, on another road, a locomotive equipped with Style 1 has run 1,000,000 miles.

Screw Threads

Screw threads have been under investigation by the sub-committee in an effort to adopt the standards for screw fits that have already been accepted by the American Standards Association and other associations. In this year's report the sub-committee recommends that page L-27 of the Manual be changed to refer to A.S.A. standards for bolt heads and nuts, and for screw threads. The former are shown in A.S.A. Bulletin No. B 18.2 and the latter in Bulletin No. B 1.1. Inasmuch as castle or slotted nuts are included in Bulletin No. B 18.2, the committee recommends that page L-21 of the Manual be eliminated.

Standardization of Pedestal Widths for Application of Roller Bearings

Letter Ballot Circular D. V.—1052 dated September 8, 1943, included as Proposition No. 11 recommendation for the standardization of pedestal-jaw openings required for friction-bearing journal boxes for steam, electric and Diesel locomotives and tenders. In announcing result of this letter ballot in Circular D. V.—1053 dated October 26, 1943, it was stated that the inclusion of this proposition in the Manual of Standard and Recommended Practice is being held in abeyance pending further consideration of certain detail by the committee. The sub-committee has agreed with the manufacturers upon certain modifications which it is felt are desirable and should be incorporated before the data is issued for inclusion in the manual and submit the following report with recommendation that the proposition be resubmitted to letter ballot in the revised form.

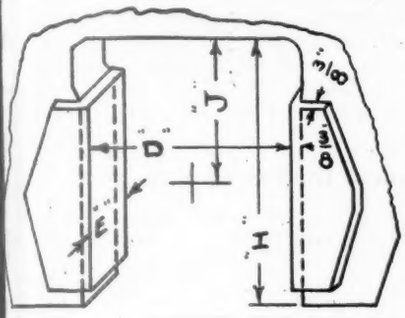
The sub-committee met with representatives of roller-bearing manufacturers who had furnished such bearings for railroad rolling stock, in order to standardize on pedestal-jaw openings.

Data submitted by manufacturers indicated that it is impractical to standardize on such openings for equipment built in the past and all pedestal-jaw openings listed are for steam, electric and Diesel locomotives as well as tenders to be built in the future.

Existing A.A.R. pedestal-jaw openings for steam-locomotive inboard engine and outboard tender trucks, as required for friction bearing journal boxes are maintained, so that suitable roller-bearing housings may be applied. The governing A.A.R. dimension requirements for inboard engine-truck friction journal boxes for 5 in. to 8 in. nominal diameter journals, are shown on Plate 4, Section F, and for outboard tender-truck friction journal boxes for 5 in. to 7 in. nominal diameter journals are shown on Page D-18 to D-21 inclusive, Section D of the A.A.R. Journal.

The application of roller bearings to Diesel switching locomotives was considered, and pedestal-jaw openings as developed for respective diameter journals of Diesel road locomotives may be suitable for Diesel switching locomotives; however, smaller pedestal openings may be satisfactory because of the lower speeds of switching locomotives.

Pedestal-jaw openings for electric-locomotive motor axles are the same as for Diesel-road-locomotive motor axles, it being understood that later on, different types of electric or other drives

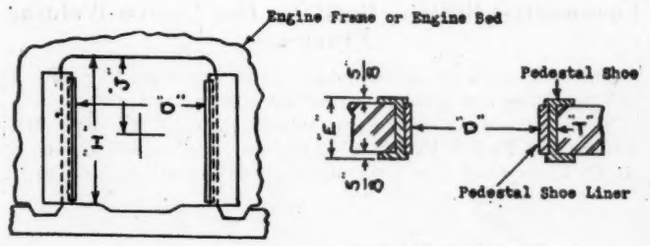


Engine truck — steam locomotives
Trailer truck — steam locomotives
Tender truck — steam locomotives
Motor and idling axles — Diesel road locomotives
Motor axles — electric locomotives
Guide truck — electric locomotives

Nominal journal diameter, in.	D, in.	H, in.	E: Motor and idling axles on Diesel road and electric locomotives, in.	E: Tender trucks on steam locomotives and guide trucks on electric locomotives, in.	E: Engine trucks outboard, on steam locomotives, in.	E: Trailer trucks, steam locomotives two-wheel truck or four-wheel truck, in.	J, in.	Remarks
4¼	9⅞	16¼	5	5	6	..	8	..
4¼, 5	11¼	18	5	5	6	..	8¾	..
5	14¼	20¼	5	6	6	..	10	‡
5, 5½	12⅝	18½	5	6 or 8*	6	..	9	..
5½	15⅛	20¾	5	8	8	..	10½	‡
5½, 6	13⅜	19½	5	8	8	8	9½	..
6	16	21½	5	8	8	8	11	‡
6, 6½	14¼	21	7	8	8	11†	10½	..
6½	16⅞	22½	7	8	8	11†	11½	‡
6½, 7, 7½	15⅛	22	8	8 or 10*	8	11†	11	..
8	18¾	25½	8	8 or 10*	8	11†	13	‡
7, 7½, 8, 9	16⅜	23	8	8 or 10*	8	11†	11½	..
7, 8, 9	17¾	23½	8	8 or 10*	8	11†	12	..
10	18⅝	24½	..	....	..	11†	12½	..
			For Engine Trucks, Inboard, Steam Locomotives Only					
7	16 3/16	20¼	..	....	5½	..	10¼	..
7½	17¼	20½	..	....	6	..	10½	..
8, 8¼	17¾	21¾	..	....	6½	..	10¾	..

* For six-wheel tender truck only.
† 9 in. on front axle of four-wheel truck having lateral resistance device.
‡ For SKF double row, single bearing only.

Fig. 1—A. A. R. Recommended-Practice Pedestal-Jaw Openings for Roller Bearings on Future Equipment—Engine and Tender Trucks



Nominal journal diameter, in.	D, in.	H, in.	E: With 6-in. thick pedestal jaw (engine bed or frame), in.	E: With 7-in. thick pedestal jaw (engine bed or frame), in.	T, in.	J, in.
10*	19⅞	25	7¼	8¼	1	12¾
10†	16¾	23¼	7¼	8¼	¾	11⅞
10½*	20⅜	25¾	7¼	8¼	1	13⅛
10½†	17¼	23¾	7¼	8¼	¾	12⅛
11*	21⅛	26½	7¼	8¼	1	13½
11†	17¾	24¼	7¼	8¼	¾	12⅜
11½*	21¾	27½	7¼	8¼	1	14
11½†	18¼	24¾	7¼	8¼	¾	12⅝
12*	22⅛	28	7¼	8¼	1	14¼
12†	18¾	25¼	7¼	8¼	¾	12⅞
12½*	23¼	29	7¼	8¼	1	14¾
12½†	19¼	25¾	7¼	8¼	¾	13⅛
13*	25	30¾	7¼	8¼	1	15⅝
13†	20½	27	7¼	8¼	¾	13¾
13½*	26½	31¾	7¼	8¼	1	16⅛
13½†	21¾	27¾	7¼	8¼	¾	14⅛
14*	26⅜	32¼	7¼	8¼	1	16⅜
14†	22½	29	7¼	8¼	¾	14¾
14½*	27⅝	32¾	7¼	8¼	1	16⅝
14½†	23	29½	7¼	8¼	¾	15
15*	27¾	33¼	7¼	8¼	1	16⅞
15†	23½	30	7¼	8¼	¾	15¼

* For Timken single-row or SKF double-row, single bearing.
† For Timken double-row bearing only.

Fig. 2—A. A. R. Recommended-Practice Pedestal-Jaw Openings for Roller Bearings on Future Equipment—Steam-Locomotive Driving Axles

developed may require changes in journal diameter and pedestal-jaw openings.

Pedestal-jaw openings for tenders may be suitable for passenger-car roller bearings having 4¼-in. to 7-in. nominal-diameter journals.

Figs. 1 and 2 cover recommended pedestal-jaw openings for equipment to be built in the future.

The letters on the drawings refer to the following: D—Opening between pedestal-jaw liners; E—width over pedestal-jaw-liner flanges; H—minimum height of pedestal-jaw opening; J—center of axle to top of pedestal-jaw opening.

Relative tolerances for pedestal-jaw openings, except driver pedestal-jaw openings, a tolerance of $+\frac{1}{16}$ in., or $-\frac{1}{32}$ in. is desired between pedestal-jaw liners for openings D, and the same tolerances for width over pedestal-jaw liner flanges E.

Distance between locomotive frame or truck frame (cast or open hearth steel) pedestal jaws is dimension D plus thickness of liners as indicated. If wedge-type liner is used, the pedestal jaw is to be tapered. Width of locomotive-frame or truck-frame (cast or open hearth steel) pedestal jaw is dimension E minus the thickness of the liner flanges as indicated. The illustrations show nominal journal diameters for axles and actual journal diameters may vary slightly from the nominal diameter as indicated.

Investigation developed that there are at present approximately 220 different pedestal-jaw openings which have been reduced, on equipment to be built in the future, to 65 different openings.

Driver and Trailer Tires

In 1941, the Locomotive Construction Committee made recommendations as to the shelling of trailer tires. It was recommended that heat-treated (quenched or tempered) tires be used to overcome shelling. This recommendation was made after four years of tests.

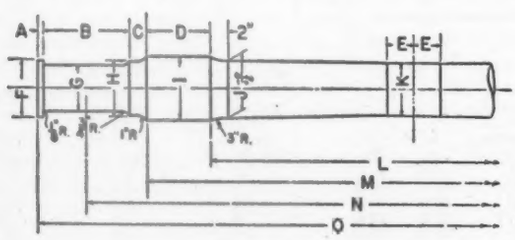
Several of the roads mentioned in the 1941 report have followed the committee's recommendation and have reported considerable success. One road, for example, reports that prior to the use of the heat-treated tires the average mileage per shelled-out tire was 114,000; the present mileage with heat-treated tires is 5,800,000.

The reports of these roads are covered in detail in the report.

Locomotive Boilers Built by the Fusion-Welding Process

The original fusion-welded boiler on the Delaware & Hudson is still operating and giving satisfactory service.

Some time ago a design was submitted by the Chicago, Milwaukee, St. Paul & Pacific for a fusion-welded boiler for one of its F6 Class 4-6-4 type locomotives. Permission has been given



CLASSIFICATION OF AXLE	SIZE OF JOURNAL	DIMENSIONS														
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
G	7"X13"	7/8"	13"	2 1/4"	8 1/8"	3"	8 1/2"	7"	8 1/2"	9 3/8"	8 7/16"	7 3/8"	3'-10 1/4"	5'-2 1/2"	6'-8"	7'-10 3/4"
H	7 1/2"X14"	7/8"	14"	2 1/4"	8 1/8"	3"	9"	7 1/2"	9"	9 3/8"	8 7/16"	7 3/8"	3'-10 1/4"	5'-2 1/2"	6'-9"	8'-0 3/4"

Fig. 3—Axles proposed for engine, trailer, and tender trucks

by the Director of the Bureau of Locomotive Inspection to construct a boiler of this design. This work is now being done by the Milwaukee at its shops at Milwaukee, Wis. After this boiler is completed it is to be stress relieved. In other words, they are following the same procedure that was followed in the construction of the D. & H. boiler.

Since the construction of the D. & H. boiler, there have been built and placed in service six furnaces for stress relieving boilers, and a seventh one is contemplated.

Research on Axles, Crank Pins and Bearings

In its work of developing and testing axles for passenger cars and tenders, the research committee on axles, crank pins, and bearings has developed axles of sizes 7 in. by 13 in. and 7½ in. by 14 in. which are suitable for use under high-speed passenger cars and locomotive tenders. The dimensions and designs of these axles are shown in Fig. 3 and their adoption for locomotive tenders is recommended. They are also recommended for use in engine trucks and trailer trucks of the outboard bearing type in which axles of these sizes can be used.

Stresses in Locomotive Rods and Motion Work

The sub-committee recommends that Page F-117 of the Manual covering side-rod knuckle-joint design be eliminated because it shows a formula for thrust or load which conflicts with the formula shown on Pages F-10 and F-11, adopted as recommended practice in 1941, and because the design shown on Page F-117 has become obsolete.

Tolerances for Cotter Keys

A.A.R. Circular No. D. V.—986, issued May 27, 1940, Exhibit I, page 61, contains a report in which it was recommended

Fig. 4—A cotter key which maintains a tight fit

that no change be made in existing standards, but where a tighter fitting cotter is desired, some form of expanding cotter be used.

Fig. 4 shows a type of cotter which is available, free of royalty, to any member railroad. This cotter has one leg crimped, insuring a tight fit in the cotter-pin hole.

Pressure Gauges for Locomotives

The War Production Board found it necessary to require the manufacturers of pressure and vacuum gauges to curtail the assortment of gauges heretofore offered for sale. Representatives of this committee collaborated with WPB and representatives of the manufacturers in determining the types and sizes of gauges considered essential for locomotives. WPB Limitation Order L-272, effective February 10, covers those now available.

The report was signed by H. H. Lanning (chairman), mechanical engineer, A. T. & S. F.; E. L. Bachman (vice-chairman), general superintendent motive power, Pennsylvania; F. E. Russell, chief mechanical engineer, So. Pac.; Frank Williams, chief mechanical engineer, Can. Nat.; A. G. Hoppe, assistant to mechanical assistant to chief operating officer, C. M. St. P. & P.; G. W. Bohannon, assistant to chief mechanical officer, C. & N. W.; J. E. Ennis, engineering assistant, N. Y. C.; J. B. Blackburn, mechanical engineer, C. & O.; L. H. Kueck, assistant chief mechanical officer, Mo. Pac.; W. H. Sagstetter, chief mechanical officer, D. & R. G. W., and K. Cartwright, chief mechanical engineer, N. Y. N. H. & H.

The report was accepted and necessary items ordered submitted to letter ballot, except the section on Standardization of Pedestal Widths for Application of Roller Bearings, which was referred back to the committee for further study.

Couplers And Draft Gears

There are now approximately 6,000 tightlock couplers in service on passenger equipment cars and locomotive tenders, of which 5,790 are the former Type T and 210 the Type H coupler. These 6,000 tightlock couplers are in service on 28 railroads and Pullman cars. Of the 5,790 Type T couplers, about 400 have been modified

in accordance with Mechanical Committee Circular No. 942-A to improve the anti-creep arrangement and apply the No. 6 operating mechanism. All Type H couplers have been applied with the No. 6 operating mechanism.

The service of these tightlock couplers is being carefully observed by the railroads and representatives of the manufacturers. These reports indicate that the modified T type couplers and the Type H couplers are giving generally satisfactory service.

Since December 1, 1943, the manufacturers have been furnishing all tightlock coupler knuckles and locks in the usual high-tensile steel, but heat-treated by quenching and tempering to increase the yield strength of the knuckle to approximately 300,000 lb. and to provide harder bearing surfaces between the knuckle and lock to reduce the present occasional sticking of locks.

To insure against the wedge lock sticking, the lock can be seated upon the knuckle-tail shelf when the couplers are fitted up new although from service wear they approach this condition. At present, the couplers are fitted up so that the bottom of the lock is seated from 3/32 in. to 5/8 in. above the knuckle-tail shelf to provide for wear and maintain the contour lines tight. By starting the coupler out with the wedge lock resting on the knuckle-tail shelf, looseness in contour lines will develop more rapidly. Experiments are under way to determine this feature.

The Mechanical Committee has prepared and issued with the approval of the Committee on Couplers a new circular No. 144, covering Inspection and Maintenance of Tightlock Couplers in Service. Copies of this circular may be obtained by addressing the Secretary of the Mechanical Division, Association of American Railroads, Chicago, or any one of the coupler manufacturers.

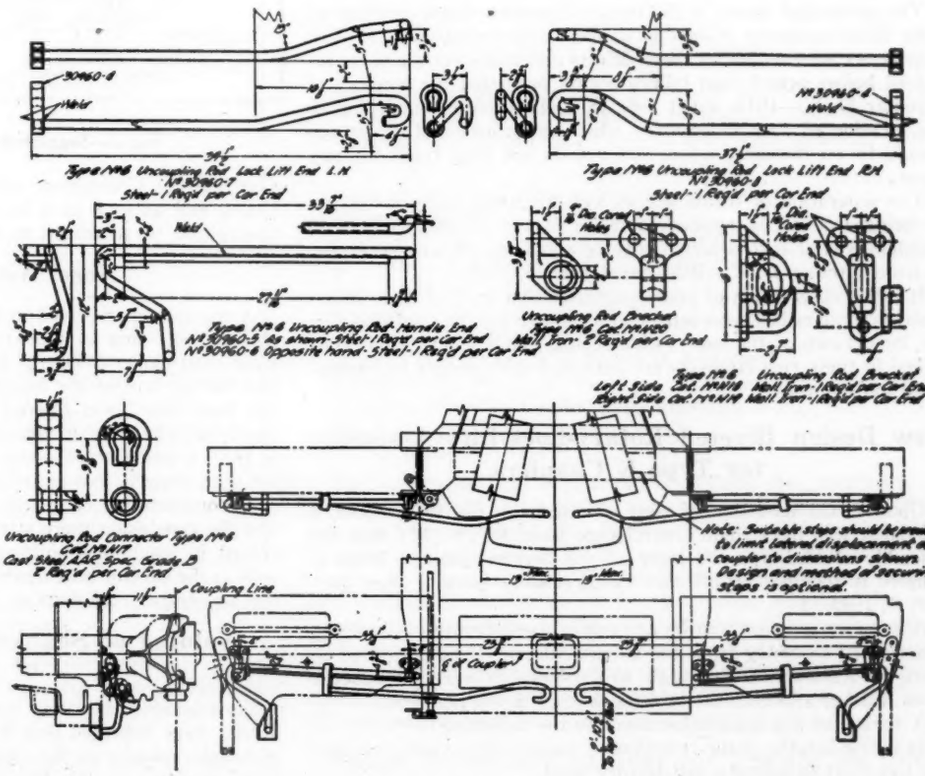


Fig. 1—A. A. R. tightlock coupler —Type No. 6 operating mechanism, typical application for use with Type H couplers and present couplers modified

Recommendations—Tightlock Couplers

Your committee suggests that the following items be submitted to letter ballot with recommendation for approval.

(a) The new design tightlock coupler, identified as A.A.R. Type H tightlock coupler, be approved as tentative standard for tightlock couplers for passenger equipment cars, superseding present alternate standard for Type T tightlock couplers.

(b) The complete set of gauges developed by the manufacturers to control the manufacture and interchange of parts of the A.A.R. Type H tightlock coupler be approved as tentative standard.

(c) The tightlock coupler operating mechanism, identified as A.A.R. No. 6 Tightlock Coupler Operating Mechanism for use with Type H and Type T latest modification, be approved as tentative standard. See Fig. 1.

(d) The coupler manufacturers be authorized to discontinue manufacture of present Recommended Practice Type T tightlock coupler, except knuckle, locks, and other fittings for maintenance and modification of existing Type T tightlock couplers.

Knuckle Failures on Passenger Cars

In considering the subject of coupler knuckle failures on passenger equipment cars at the meeting of your committee on February 3, 1943, each member of the committee, as well as representatives from the Union Pacific, Southern Pacific and The Pullman Company, were requested to assemble detailed information of all passenger equipment knuckle failing during the three months period of March, April and May, 1943, and to send the failed knuckles together with information concerning each failure, to the chairman of the Coupler Manufacturers Mechanical Committee.

There were 29 failed knuckles received, viz.: One cracked tightlock knuckle, seven Type E knuckles, eight Type D knuckles, and 13 miscellaneous non-standard types.

Analysis of these failed knuckles indicated that the cracked tightlock knuckle might be attributed to a foundry defect. Of the seven Type E knuckles that failed, all of them showed minor manufacturing defects consisting of porosity or small gas pockets; one of these seven failures resulted from an emergency application of the brakes. The Type D knuckles are obsolete and the remaining 13 were the old M.C.B. type which have about 50 per cent of the strength of the Type E knuckle.

Study is being made as to the possibility of increasing the strength of Type E knuckles and your committee is working with the coupler manufacturers to see what can be accomplished along this line.

Proposed Interlocking Coupler for Freight Equipment

The Mechanical Committee of the coupler manufacturers was requested by the Committee on Couplers to give consideration to the development of a postwar interlocking coupler for freight equipment for the purpose of supporting and thus preventing the mating coupler falling to track in case of coupler breaking or coupler attachments failing. The arrangement should be such that it will operate in conjunction with and secure the benefits of those features now incorporated in the tightlock coupler in passenger service. Naturally, these benefits will not be obtained until the couplers of

the cars coupled together both contain this feature, but will become progressively effective as new couplers are applied.

The design of such a coupler is being considered by the Mechanical Committee of the coupler manufacturers and one preliminary design has been evolved. This particular design has an interlocking and anticreep arrangement similar to those features in the A.A.R. Type H tightlock coupler, except it is provided with a straight lock and requires no machining of parts or fittings.

The Mechanical Committee of the coupler manufacturers is progressing this matter, but it should be understood that a single standard must ultimately be produced which will mate with and maintain the locking and supporting features of the tightlock passenger couplers.

Involved in a design of this kind is the car construction, at lateral clearance for short-curve coupling and vertical clearance for passing cars over the hump. These requirements affect center sills, location of draft stops, spring or adjustable carrier irons, etc.

The approval of the General Committee is requested, which should carry with it the appointment of a sub-committee from the Coupler and Draft Gear Committee and a sub-committee from the Car Construction Committee to work with the Mechanical Committee of the coupler manufacturers to evolve and recommend an acceptable design.

Coupler and Yoke Defects—Train Parting

The parting of trains as the result of coupler-shank or coupler-yoke failures always results in damage and serious delays. The importance of discovering these defects and renewing the parts involved before actual road failure occurs prompted the issuance of Circular D. V.—1045, dated July 15, 1943, directing attention to the location of such defects for which inspectors and repairmen should be on the alert when cars are on the shop track for any cause.

The separation of trains due to lock-lift toggles either missing or being incorrectly applied to Type D and E rotary-operated couplers was of such a serious nature a year ago it was necessary to issue Circular D. V.—1044, dated July 15, 1943.

It is the observation of your committee that each of these informative circulars has been beneficial in improving the condition, but the importance of the supervision seeing that the provisions contained in these two circulars are complied with cannot be emphasized too strongly.

New Design Riveted Rotary-Lock-Lift Assembly for Type E Couplers

Upon recommendation of your committee in the 1943 report, a provision was inserted in Interchange Rule 3 (c) (12) that the assembly riveted-type lift lever of the bottom-operated Type E coupler is required on all cars in interchange on and after January 1, 1945.

A member suggests that on account of the difficulty of obtaining this riveted assembly from the manufacturers, he be permitted to rivet the trunnion of the toggle to the lock-lift lever, introduce a ⅛-in. washer and electric weld the washer to the trunnion.

A review of this suggestion develops the following:

(a) The lengths of the trunnion on some of the existing toggles are too short to assure a satisfactory weld.

(b) A special washer would be required.

(c) Many of the existing toggles, perhaps more than 50 per cent, are made in malleable iron. This material is not satisfactory to permit welding.

Since this suggestion was received, the manufacturers advise they are now in position to furnish the riveted type of lock-lift assemblies, but on account of the number of the present two-piece lock-lift assemblies that must be changed out, it is recommended that the effective date when all cars must be equipped be extended one year or to January 1, 1946.

Draft-Key Retainers

A member road has suggested a type of draft-key retainer, as per sketch (Fig. 2), for use particularly in connection with two- and three-key Farlow attachments where the check plate is on the outside of the center sill and the standard type retainer has a tendency to override the flange of the check plate thus causing the cotter at the bottom end of the retainer to be sheared. This suggested retainer has the ends of the cross T elongated and curved to fit around the edges of the draft key. These extended ends of the cross T serve the purpose of preventing the retainer from turning and fouling the cheek plate and in this manner protecting the cotter against the shearing action that occurs with the standard type key.

This device has been referred to the Car Construction Committee for consideration. It is the opinion of your committee that the subject of an improved cross key retainer, free from patents, should receive prompt consideration by a joint subcommittee of the Car Construction Committee and Committee on Couplers and Draft Gears, and as soon as it is evolved and approved by the General Committee, be submitted to letter ballot for adoption.

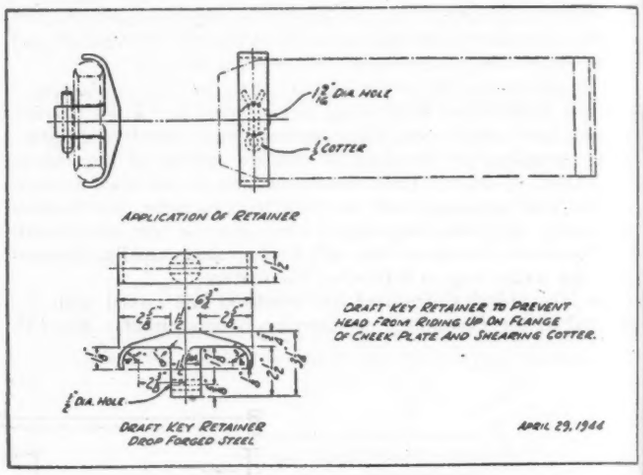


Fig. 2—Suggested type of draft key retainer

Nose Wear of Knuckles

A request was received from a member road indicating the desirability of building up knuckles on account of having exceeded nose wear limit gauge 24992-A. Investigation of this request developed that 90 per cent of the knuckles being removed for nose wear on this line were Type D, and since it is undesirable to perpetuate the Type D knuckle, its manufacture now having been discontinued in 1933, it was concluded that the proposed reclamation of couplers for nose wear be not approved.

In consideration of giving this attention to Type E knuckles it was the conclusion there would be too much mechanical work involved in machining built-up knuckles to the proper contour as well as the careful heat treatment that would be required to justify this process of reclamation.

Welding of Shanks on Couplers in Vicinity of Key Slot

Tests conducted in the Association laboratory at Purdue University have indicated that it is not necessary to prohibit welding of coupler shanks in the vicinity of the key slot. Therefore, the Sub-committee on Welding of Couplers and Coupler Yokes has recommended that Paragraph (c-1) of Section C, Interchange Rule 23, be revised as follows:

Proposed Form: (c-1) Transverse cracks, including shrinkage cracks, in shank of coupler, from end of shank to and including back wall of horn, may be welded. There is no limitation in length or depth of cracks that may be welded.

The above recommendation has been approved by this committee and the secretary instructed to refer same to the Arbitration Committee.

Welding Metal Shims on Butts of Couplers

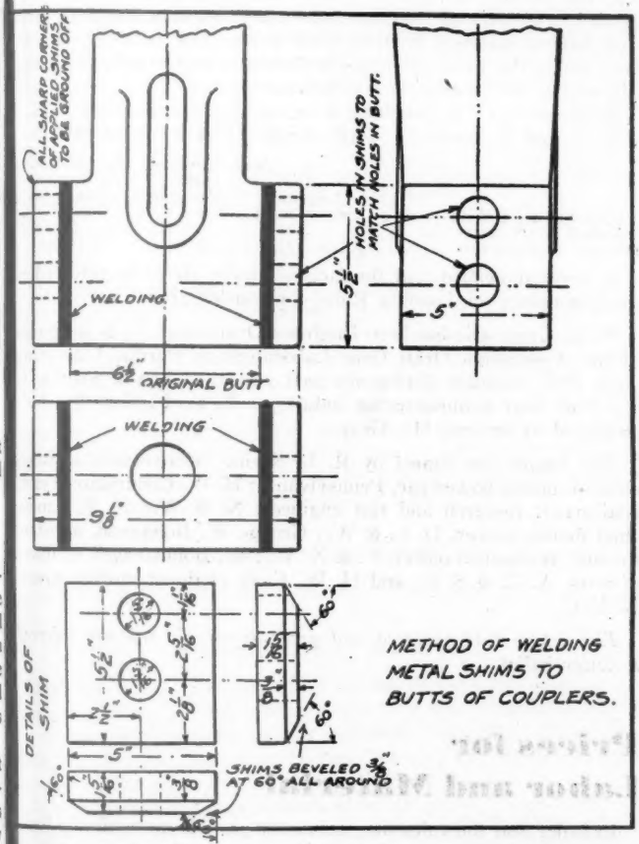
Several railroads have stated they have an accumulation of 5-in. by 7-in. shank couplers with 6½-in. butts for which they have only a limited use, but are badly in need of 5-in., 7-in. and 9⅛-in. butt couplers. Permission was requested to weld metal plates to the top and bottom of the butts of these 6½-in. butt couplers to bring them up to 9⅛ in. A subsequent canvass of a representative list of member roads showed that several of these roads have substantial quantities of such couplers available for conversion.

The sub-committee on Welding of Couplers and Cast-Steel Yokes was instructed to conduct tests and submit recommendations. Specimens were prepared by the Pennsylvania and tests were made under the 27,000-lb. drop hammer at the Association laboratory at Purdue University. Standard 9⅛-in. butt couplers were included in the tests to provide a basis for comparison. After completion of these tests, a report was submitted by the sub-committee, together with the following recommendations:

Based upon results of tests, it is permissible to adapt couplers having 6½-in. butts by welding metal shims on top and bottom of butts, in accordance with the following regulations:

(a) Shims should be cut to proper size—1 5/16 in. by 5 in. by 5½ in.

(b) Drill shims in pairs to match holes in related coupler butts.



Welding of metal shims to coupler butts is permitted if recommended procedures are employed

(c) Grind coupler butts to give neat seating of shims.

(d) Bevel shims ⅜ in. at 60 deg. angle (or give J weld preparation) all around contact face. No beveling of coupler butt permitted.

(e) Tighten shims to welding position on coupler butt by dummy pin and key, and exercise care to see that shim edges are flush with corresponding edges of coupler butt.

(f) After shims are thus in position, weld to coupler butt by the shielded-arc electric method.

(g) Normalize the welded coupler.

(h) All sharp corners of applied shims must be removed by grinding.

The above recommendations have been approved for submission to the General Committee, with the further recommendation that a circular be distributed to all member roads and included in the Rules of Interchange.

Limitation on Welding of Couplers and Cast-Steel Coupler Yokes

As stated in the report last year, a series of tests were conducted under the direction of a special sub-committee for the purpose of determining whether present restrictions on the welding of couplers and cast-steel yokes could be safely revised to conserve materials during the present emergency. The recommendations of the sub-committee were subsequently approved, with some modifications, by this committee and the Car Construction Committee and then incorporated in the Interchange Rules.

The original tests and recommendations were limited to welds made by the electric process. Later the sub-committee was enlarged and instructed to conduct similar tests on specimens welded by the oxyacetylene process, to ascertain if the emergency provisions already approved for these parts when welded by the electric process could be extended with safety to include the oxyacetylene process.

These latter tests have been completed. Based upon the results of these tests, a majority consisting of three members of the sub-committee recommended "that present restrictions on gas welding of cracked couplers and yokes be not removed, since the average railroad reclamation plant is not prepared at the present time to perform this work satisfactorily by gas welding." One member submitted a minority report with the recommendation "that the shielded arc process be prohibited on cast-steel couplers and yokes and that the oxyacetylene process, using the specified procedure that was followed by the C. B. & Q., be made mandatory in making tension welds on these parts."

These reports were received by this committee and the recommendation contained in the report of the majority of the sub-committee is approved.

The majority and minority reports are on file in the office of the secretary of the Mechanical Division and are not reproduced in this submission on account of the volume of the reports.

Approved Draft Gears

The number of approved draft gears still stands at twelve, but these twelve gears now represent the products of seven instead of six different manufacturers. Three of the twelve gears are conditionally approved.

Cardwell M-25 (Conditionally approved)
Edgewater B-32-KA (Approved)
Miner A-2-XB, Cylinder D-7940 (Approved)
Miner A-22-XB, Cylinder D-7935 (Approved)
National M-17-A (Approved)
National M-50-B (Approved)
Peerless H-1-B (Approved)
Hulson-Clark 150-B (Conditionally approved)
Waugh-Gould 403 (Approved)
Waugh-Gould 410 (Conditionally approved)
Westinghouse NY-11-F (Approved)
Westinghouse NZ-11-F (Approved)

The Association has been officially advised that ownership of the Waugh-Gould Type 150-B, a conditionally approved draft gear, has been acquired by the Hulson Company, Chicago, and will be designated hereafter as the Hulson-Clark gear. Following this transfer of ownership from Waugh Equipment Company, several modifications in the design of this gear were submitted for approval. In the opinion of the sub-committee these modifications are so extensive as to require complete new tests before a decision can be given, and the manufacturer was so advised. Formal application for these tests has been received, test specimens have been selected and the tests are now in progress.

Waugh Twin-Cushion Gear for Freight Service

Following extensive laboratory tests of this gear, as reported last year, permission was granted for the application of 1,400 car sets to cars in interchange service, but these installations have not been completed because of curtailment of the use of rubber.

In addition to the laboratory tests, the sub-committee obtained installation data and measurements on seven car sets applied to stock express cars which are accumulating mileage somewhat rapidly. Two gears, comprising one of these seven car sets, were originally installed in June, 1940. These gears were removed, checked for capacity, inspected and reapplied in April, 1941. Recently these same gears, also two additional gears that were applied in May, 1941, were removed and again brought into the laboratory for test, after which they were once more returned to service. A report on the performance and condition of these gears is being prepared.

Also, one gear is being held in the laboratory in continuous assembled compression, and each month a capacity test is made to determine how it stands up. This has been continued for about two years now, and so far the gear has not lost any capacity.

Substitutions of Materials

With the approval of your sub-committee, some manufacturers have made minor substitutions in materials used in draft gears during the present emergency. Complete information is not available as to the physical properties of all of these materials but steps have been taken to obtain this information.

Check Test of Gears After Five Years of Service

Our report last year contained the results of a check test of certified draft gears after five years of service. These tests were made in 1941. All of the gears tested at that time were manufactured and applied in 1936. Since that time two of the gears which made a very unsatisfactory showing in the 1941 check tests have been reclassified in the Interchange Rules as non-approved gears and have been superseded by new types. As soon as these new gears have had five years of service it is proposed to make a new check test, and the results will be reported to the members.

Draft Gears Manufactured in Canada

In response to an inquiry received from a Canadian member road, a letter was addressed to all manufacturers of certified draft gears requesting answers to the following questions:

1. Are any of the draft gears manufactured by your company under A.A.R. certificate of approval made in Canada, and, if so, will you please state name and location of Canadian plant.
2. Does all of the information which you have filed with this office relating to design, material and methods of manufacturing, including working-in processes and test facilities and procedures, apply equally to draft gears produced in both the United States and Canada? If not, please describe all variations in practice.
3. Members of the sub-committee on Draft Gears have at various times inspected each of the plants in the United States where certified gears are produced. Have you any objection to an inspection of your Canadian plant and facilities by one or more representatives of the sub-committee?

Replies to these letters indicated that some Canadian manufacturers were not complying with all A.A.R. specification requirements. Subsequently a representative of the sub-committee visited each of the Canadian plants. This inspection revealed a wide variety of conditions, some of which were considered unsatisfactory. In one instance, due to a misunderstanding, an obsolete design of gear was still being manufactured and sold as a certified gear. At this same plant no test facilities had been provided and there was no way of determining whether or not gears manufactured met specification requirements. One plant was found fully equipped with drop test and other necessary facilities and the draft gears produced appeared to be equal in all respects to those manufactured in the United States.

Wherever unsatisfactory conditions were found, however, prompt assurance was given that these would be corrected as quickly as possible.

In view of the above facts, it was decided, with the approval of the Committee on Couplers and Draft Gears, that a reasonable time would be allowed to install necessary facilities and that a test would then be made of all certified draft gears produced in Canada, as follows:

Peerless H-1-B
Miner A-22-XB, Cylinder D-7935
Miner A-2-XB, Cylinder D-7940
Cardwell M-25
Westinghouse NY-11-F
Westinghouse NZ-11-F
Waugh-Gould 403

Specimens will be selected from railroad or car builders' stocks by a representative of the sub-committee and tests will be made in the Association laboratory at Purdue University. It is expected that these tests will be made within the next few weeks. Both the Canadian National and Canadian Pacific are cooperating with the sub-committee in this check.

Blocking Couplers on Duryea Cars with Multiple Loads

The attention of your sub-committee has been called to Loading Rule 21 which requires that, "except on cars equipped with Duryea underframes," couplers between cars on which load is fully or partially carried, must be blocked. Question has been raised as to the necessity for the quoted exception.

For conventional cars equipped with draft gears it is specified that blocks be placed between the coupler horn and the striking casting. Blocks so placed on Duryea underframe cars would have little effect because the construction is such that only 1 in. of movement, and this in buff only, is possible between the coupler and the center sill. On the other hand, if the coupler is blocked against movement with respect to the car body, as it is on conventional cars, the Duryea cushioning device on all cars so blocked would be rendered inoperative. This is not the case with cars equipped with friction draft gears because the draft gear on the other end of each car is not affected and can still afford its usual protection to car and lading.

Car impact tests conducted by your sub-committee have shown that the normal movement between car bodies, under impact, is greater with cars of Duryea underframe construction than with cars having standard friction draft gears. For example, in two tests where the speed of impact in each case was exactly the same, 5.03 m.p.h., the results were as follows:

With one car (A) striking a string of three standing cars, B, C, and D, coupled. Total weight of each car 187,000 lb.

Cars Equipped With	Speed of impact, m.p.h.	Max. movement between car bodies B and C, in.	Max. Movement between car bodies C and D, in.
Standard draft gears	5.03	$5\ ^{5}/_{16}$	$5\frac{1}{16}$
Duryea underframes	5.03	$10^{11}/_{16}$	$14^{1}/_{16}$

It is recommended that the facts set forth above be referred to the Committee on Loading Rules for consideration.

W. E. Gray, who has been Engineer Draft Gear Tests in charge of the Association Draft Gear Laboratory at Purdue University since 1927, resigned during the past year to accept a position in the draft gear manufacturing industry. T. K. Sanders has been employed to succeed Mr. Gray.

The report was signed by R. L. Kleine (chairman), assistant chief of motive power-car, Pennsylvania; H. W. Coddington (vice-chairman), research and test engineer, N. & W.; F. T. James, chief motive power, D. L. & W.; George W. Bohannon, assistant to chief mechanical officer, C. & N. W.; W. Bohnstengel, engineer of tests, A. T. & S. F., and H. W. Faus, engineer motive power, N. Y. C.

The report was accepted and necessary items ordered referred to letter ballot.

Prices for Labor and Material

In order that the rules may currently provide an equitable basis for inter-road billing, your committee has continued the work of analyzing material, labor and new equipment costs in A.A.R. Interchange Rules 101, 107, 111, and 112 of the Freight Car Code, and Rules 21 and 22 of the Passenger Car Code, with a view to determining and recommending necessary changes to be made in the next supplement to the current code.

Rule 101

All miscellaneous material prices in Rule 101 were rechecked as of March 1, 1944, quotations submitted by the purchasing agents of the ten selected railroads, representing thirty-nine per cent of total freight-car ownership in the United States and Canada, showing a slight upward trend in material markets as indicated by detail recommendations for revisions shown under this rule.

Item 253-D of Section II covering non-approved Friction Draft Gears is modified to include the Miner A-19-SF gear. Also, the first paragraph of the note covering Friction Draft Gears on page 198 of the 1944 Code is modified to provide an equitable means of credit allowance where such gears are removed with broken or cracked casing.

A new table of arbitrary weights for five types of coupler yokes most commonly used has been set up in this rule, to facilitate preparation of and checking bills for freight-car repairs.

Rule 107

Item 32 covering tank outlet-valve-chamber cap is modified to include labor allowance for application of gasket other than

rubber. The item is also clarified to indicate that cap reapplication charge can only be made on authority of a defect card and when the cap is found hanging by a chain.

A new second paragraph is added to Item 108-A to provide allowances for lining or ceiling where nails are set but holes not puttied.

Item 256 is modified and new Item 256-A added, to provide for application of truck springs in National type B or B-1 trucks.

The semi-annual review of labor rates as of October 1, 1943, disclosed that due to decrease in proportion of helpers and apprentices to mechanics, an increase in the A.A.R. labor rate from actual of $1.4187 (called $1.40) to $1.4374 (called $1.45) was in order. As a decision with respect to wage increases for non-operating employes was anticipated your committee decided to make no change in the labor rate effective January 1, 1944; but immediately the decision was announced all labor rates and allowances were reviewed, including combination labor and material items, and revised rates and allowances were made effective February 1, 1944, in Supplement No. 1 to the current Code.

Rule 111

New Item 15-A is added, to provide allowance for periodic attention to AB-1-B freight-brake equipment.

Rule 112

Because of the small number of box, hopper, gondola and covered hopper cars constructed during 1943, and because no refrigerator cars were reported built during the year in the United States, no change in settlement prices for any of these types of freight-train cars is recommended.

Based on the cost of 452 tank cars constructed during 1943, recommendations are made in this rule with respect to reproduction pound prices for new tank cars of all classes, in order that the supplement of August 1, 1944, may reflect 1943 costs in lieu of the figures shown in the present Code.

Passenger-Car Rule 21

No modifications are recommended in this rule.

Passenger-Car Rule 22

Material prices were rechecked on the basis of quotations as of March 1, 1944, showing small changes in a few items as indicated by detail recommendations for revisions appearing under this rule. Aside from these price changes, no modifications are recommended in this rule.

It is the intent of the committee to investigate labor and material costs again in October and if sufficient change develops, necessary revisions will be made and inserted in the rules effective January 1, 1945.

The report was signed by A. E. Smith (chairman), vice-president, Union Tank Car Co.; J. D. Rezner (vice-chairman), superintendent car department, C. B. & Q.; P. Kass, superintendent car department, C. R. I. & P.; T. J. Boring, general foreman, Pennsylvania; H. H. Boyd, assistant chief motive power and rolling stock, Can. Pac.; A. H. Gaebler, superintendent car department, General American Transportation Corp.; and, G. J. Flanagan, general car inspector, N. Y. C.

The report was adopted.

Committee On Tank Cars

(The committee reviewed, for the record, its extensive activities during 1941-42 and 1942-43 including the development of specifications for emergency designs of chemical containers and gasoline car tanks required for military service and presented the following report of work done in 1943-44.—Editor.)

During the year the committee considered a total of 170 dockets and applications for approval of 4,153 designs, covering materials and construction of new shipping containers for mounting on new cars or for replacement on existing cars.* One application covered one multiple-unit car to be used for the transportation of 15 Class I. C. C. 106-A-500 one-ton containers. Seventy-seven applications covered alterations in, additions to, or conversions and reconditioning of 2,857 existing tank cars or shipping containers.* Seven applications requested approval of tank car appurtenance designs, or materials with reference to specific cars.*

At the solicitation of the Bureau of Service, the committee reviewed designs for, and provided recommendations with respect to, welded steel flasks proposed by the Navy department, Bureau of Aeronautics, for the transportation of helium.

Definitions and Designating Letters

The committee formulated a general revision of the Class T tank car type definitions and designating letters. The revised definitions provide descriptions of the various types of tank cars based on their physical characteristics and delete the former references to the ladings permitted to be charged into the tanks with which they are equipped. The revised definitions also provide a convenient code for the use of owners in listing their tank cars in The Official Railway Equipment Register.

By direction of the General Committee recommendations of the Committee on Tank Cars were submitted to letter ballot. Notice of adoption of these recommendations is contained in Circular No. D. V.—1051.

Substitutes for Tank Cars

Starting in 1941, with the release of oil tankers from their normal service of supplying the eastern seaboard refineries, the demand for tank cars was greatly increased. Inability to meet this demand at all times resulted in there being brought to the committee's attention all manner of suggested substitutes for the rail movement of petroleum and petroleum products. Upon review, a majority of these suggestions were found to be impractical or involved serious hazards to rail transportation. Approval of these was withheld.

For these few suggestions having some merit the committee authorized the fitting up of cars for service trails and restricted the use of these to the handling of the less hazardous inflammable materials. Those so authorized were as follows:

Pennsylvania Class X-31 Auto Car Number 69741

The Pennsylvania divided the body of this car into six compartments and installed suitable piping and control valves for overhead loading and bottom unloading, including a venting as well as a Ventalarm arrangement for determination of required cell outage. Each compartment was equipped with a Mareng Cell by the United States Rubber Company at their Mishawaka, Ind., plant. The cells were fabricated of material composed of two layers of balloon cloth between three layers of Type F A Thiokol.

This car was placed in service between Floreffe, Pa., and the Pennsylvania enginehouse at Harrisburg, Pa., an approximate distance of 268 mi., handling No. 3 fuel oil. It was initially loaded on October 30, 1942, made a total of 16 trips, transported 193,965 gal. in loads ranging from 8,548 to 15,690 gal., with the last trip completed on November 17, 1943, bringing the total round trip miles to 8,594.

Defects and failures not involving the cells proper occurred on every trip but No. 6. On the thirteenth trip, completed June 10, 1943, oil was found dripping from the car under cells 4 and 6. After being unloaded it was moved to Altoona where, following a thorough examination, it was given a complete overhaul with the car and the wood compartment walls along with the piping being put in first-class condition. After the Mareng cells were replaced, these having been repaired at Altoona by representatives of the United States Rubber Company, the car was restored to service receiving its fourteenth load on September 17, 1943. When unloading the car on its sixteenth trip, cell 2 was found to be leaking. The car was returned to Floreffe for the seventeenth trip with the instruction that cell 2 was not to be loaded.

* The detail lists are not included in this abstract of the committee's report.

Upon attempting to load the car for Trip No. 17 on December 26, 1943, leaks also appeared in cells 1, 3 and 5.

As a result of final inspection on March 16, 1944, it was decided continuation of this test would serve no further useful purpose and authority was granted to discontinue it, dismantle the Mareng cell arrangement and restore the car to normal service.

Santa Fe Box Car Number 118032

The Atchison, Topeka & Santa Fe divided the body of this car into four compartments and installed suitable piping and control valves for overhead loading and bottom unloading, including a venting and an overflow piping arrangement to indicate maximum loading level of the tanks. Each compartment was equipped with a Flexitank by the Flexitank Corporation. The Flexitanks were fabricated of No. 6 canvas friction treated and coated on the lading side with du Pont Farraprene.

This car was assigned to service between Lockport, Ill., and the Santa Fe Eighteenth Street enginehouse, Chicago, a distance of approximately 33 miles, handling Diesel fuel oil. It was initially loaded June 10, 1943, made a total of 60 trips up to March 31, 1944, transporting 462,045 gal. in loads ranging from 4,845 to 9,113 gal. Starting with Trip 1 reports indicated some small leakage or slight seepage on all but two trips. The car was withdrawn from this service in April, 1944, as continuation of the tests would serve no further useful purpose.

S. E. R. X (Formerly D. T. & I.)

All-steel auto cars 13052, 13096, 13208 and 13224 were equipped with compartments, the necessary piping and four Flexitanks each by the Flexitank Corporation at its Aurora, Ill., plant. All four cars were loaded at West Port Arthur, Tex., on June 10, 1943, with 9,400 gal. of gas oil. They were unloaded at Gulfport, S. I., N. Y., on June 20, 1943. Upon return to West Port Arthur one Flexitank in car 13052 and three Flexitanks in car 13224 were reported to be defective. Information supplied us indicated cars 13052, 13096 and 13208 each made two loaded trips and car 13224 one loaded trip from West Port Arthur to Gulfport. Cars were returned to the Flexitank Corporation during October, 1943, for restoration to their former condition, the test having been discontinued.

Baltimore & Ohio Box Car Number 390000

This car, equipped by the Baltimore & Ohio Railroad with four steel-lined wooden tanks having suitable piping arrangement for venting, outage determination, overhead loading and bottom unloading, was placed in service February 23, 1943, between Baltimore, Md., and Washington, D. C., hauling Diesel fuel oil. Examination made after they returned from its second loaded trip developed the steel linings of the wooden tanks had been distorted in several places, this being attributed to a severe shock. Finding it impractical to repair the original linings, all four tanks were equipped with new ones. No further reports have been received of any difficulties with this car or its oil-carrying equipment since its restoration to the above service. Reports supplied us indicate that since installation of new linings and up to January 30, 1944, this car completed 43 trips during which it transported 510,284 gal. in loads ranging from 9,777 to 12,238 gal.

L. C. L. Corp. Cement Containers

Early in 1943 the committee approved proposal of the L. C. L. Corp. to convert one hundred car sets of their air activated cement containers, which are regularly handled on gondola cars provided with suitable devices for retaining the containers in position while in transit, so as to make these suitable for the transportation of fuel oil and other petroleum products having flash point above 80 deg. F. Some of the cars assigned to this service mounted five containers having a total capacity of 8,750 gal. while others had six containers having an aggregate capacity of 9,720 gal. No reports have been furnished to indicate that any difficulties have occurred in the operation of these containers in petroleum products service.

Baltimore & Ohio Box Car Number 390050

It was quite apparent from the numerous suggestions for new types of liquid transport rail vehicles offered that these did not take into account the serious fire and explosion hazards involved in their proposed use. To indicate clearly the nature of equipment that would meet with the committee's approval for emergency service in the handling of the higher flash point petroleum products certain fundamentals, which it was felt would provide a reasonable degree of safety, were first determined upon. Following this, specifications for containers to be installed in house type cars were drawn and arrangements made to fit up a test car based on these. It was agreed that only cars of which there was some surplus should be used so that if the test confirmed the committee's judgment additional cars could be equipped promptly should the demand continue.

The specifications called for a design of welded container having walls with minimum of 0.10 in., preferably 0.125 in. thickness in which the sides, ends and tops would be corrugated to provide increased stiffness. The specifications also required the containers to be equipped with a two per cent expansion dome having connection to covered roof openings for top loading and syphoning of contents. The Baltimore & Ohio furnished a car to the same design as the one it had fitted with steel-lined wooden tanks and arrangements were made with Youngstown Steel Door Company to fabricate and install the corrugated steel tanks with all necessary fittings. The completed car B. & O. 390050 equipped with five of these corrugated steel tanks having a total capacity of 12,500 gal. filled with water was subjected under direction of the committee to impact tests at the Youngstown, Ohio, plant of Youngstown Steel Door Company on April 20, 1943.

The test demonstrated that only some minor changes, particularly having to do with improving the blocking arrangement, were necessary. After these had been made the car was assigned to service on the Baltimore & Ohio between Canton, Md., and Washington, D. C., handling Diesel fuel oil. It received its first load on May 6, 1943. Reports furnished cover a total of thirty-six loaded trips. During these a total of 457,503 gal. was handled in loads ranging from 12,533 to 12,969 gal. The committee is agreed that should there be need for additional equipment for emergency transportation of petroleum products having flash point above 110 deg. F. such cars as may be required should be fitted up along the same lines as was B. & O. box car 390050.

The only defects developing during this service were four slight leaks all being readily corrected without any loss of service of this car.

Toncan Iron Tanks

Upon recommendation of the committee, as concurred in by the Bureau of Explosives and supported by results obtained in service trials of 25 similar cars authorized by the Commission's order of August 6, 1941, for experimental service trials transporting sulphuric acid, the I. C. C., by order dated October 27, 1943, authorized the construction and similar service trials of 50 additional tank cars conforming to Specification I. C. C.-103-A except that Toncan iron plates were permitted to be substituted for specification openhearth boiler plate steel of flange quality in the fabrication of the tanks.

Modification of Interstate Commerce Commission Regulations

To make available additional equipment for the transportation of liquefied petroleum gas having pressure not exceeding 45 lb. gauge per sq. in. at 105 deg. F., then required to be promptly moved to processing plants to avoid shutdowns at the producing points due to lack of storage or at the processing plants because of lack of these materials, the committee recommended modification of the Commission's regulations to permit the use of inflammable liquid cars having some minor modifications for a limited time and in a restricted territory be employed to relieve the situation.

This recommendation was concurred in by the Bureau of Explosives and the required authorization is contained in I. C. C. order of January 8, 1944.

The Commission's order of January 8, 1944, also further increased the utility of inflammable liquid cars converted for liquefied compressed gas service and so marked without the necessity of any physical changes, if the cars meet the specifications prescribed, should it be desired to use these for the transportation of inflammable liquids having vapor pressure not exceeding 40 lb. per sq. in., absolute, at 100 deg. F. This modification of the regulations resulted from recommendations submitted to the commission by the committee and the Bureau of Explosives.

The report was signed by F. Zeleny (chairman), engineer of tests, C. B. & Q.; W. C. Lindner (vice-chairman), chief car inspector, Pennsylvania; A. G. Trumbull, chief mechanical engineer, C. & O.; L. R. Schuster, engineer car construction, Sou. Pac.; R. D. Bryan, mechanical assistant, A., T. & S. F.; L. R. Christy, superintendent car department, Mo. Pac.; D. S. Clark, administrative assistant to head, School of Mechanical Engineering, Purdue University; A. E. Smith, vice-president, Union Tank Car Company; R. T. Baldwin, secretary, The Chlorine Institute, Incorporated; H. J. Gronemeyer, supervisor car equipment, E. I. duPont deNemours & Company, Incorporated; R. W. Thomas, manager chemical products department, Phillips Petroleum Company; G. W. Thomas, master car builder, Deep Rock Oil Corporation.

The report was accepted.

Report on Loading Rules

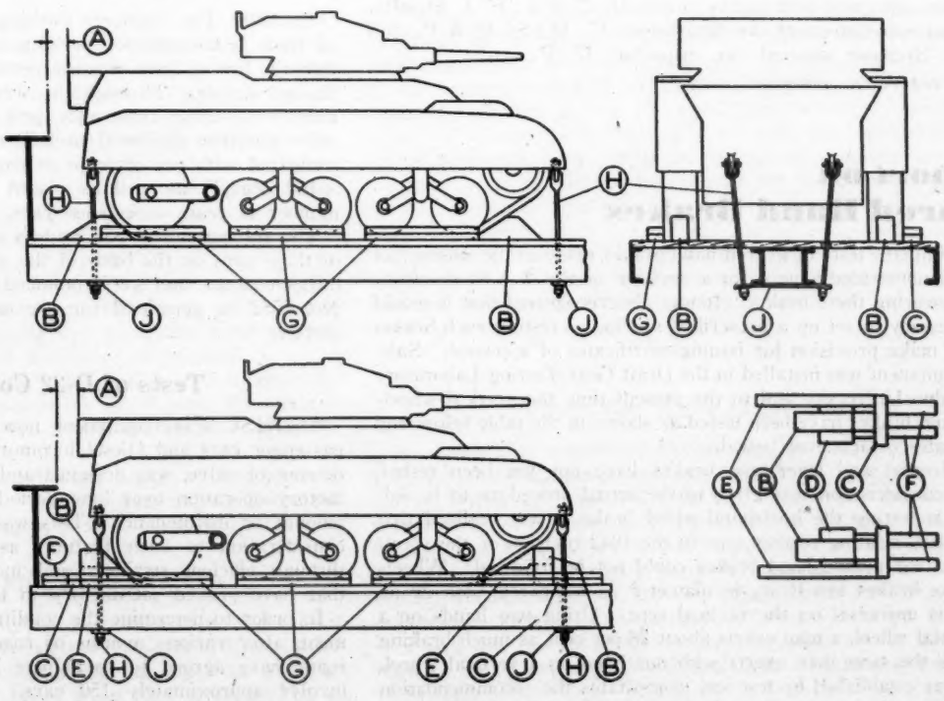
The annual report of the Committee on Loading Rules for the year 1944, covers all matters which have come before the committee since the last annual meeting report was presented in June, 1941.

Many changes and additions in the rules in effect at that time have been made in the interim, this action being necessary by your committee to meet the rapid change in shippers' methods and to promote better and safer securement for the many diversified types of loads that have developed since the war started. All of the changes and new rules embodied in this report, including those incorporated in present Supplement 2, which cancelled Supplement 1, were adopted only after careful study and consideration on the part of your committee.

Drastic change in loading of steel plates has been made. This action was brought about by the fact that transcontinental shipments of this material were getting in difficulty because heavier loading was resulting in side movement where total vacant space between car side and load was 18 in. or less. Such shipments did not require side securement under the present rules, with the result that many loads were found shifted over to one side of the car, creating a grave hazard, and in many such instances, derailment of cars occurred. It was therefore, after tests and comprehensive study by your committee and the special subcommittee on Car Construction, deemed highly desirable on shipments of this character, to reduce the permissible total side clearance to 8 in. Incidentally, the personnel of the Committee on Loading Rules has been augmented by a special sub-committee composed of the mechanical engineer of the division and four members of the Car Construction Committee to collaborate with your committee on loading problems. Their function is in an advisory capacity on engineering matters involving loading.

During the past three years the responsibilities of the committee have been greatly increased due to the transition from peace time to war time production of major industry. By reason of this fact, a large number of meetings resulted in order to cover every phase of the many loading problems presented to your committee by the War Department and shippers. Twenty meetings of the entire committee were held to dispose of the various subjects docketed for consideration. Twelve meetings of the Rules and Figures Committee were held for the purpose of preparing the necessary changes in general rules and figures and 30 meetings with various shippers' groups throughout the country were held to collaborate on changes in loading practices. In addition to the above, 50 meetings were held with the War and Navy Departments by the special sub-committee on Army and Navy loading problems. All of this required considerable time on the part of your committee to obtain the desired results and create a better understanding between shippers and the carriers. Again, as in the past, the cooperation of the shippers in working with your committee was of the utmost benefit, and they are to be highly complimented for their efforts and assistance in the formulation of the various changes and additions.

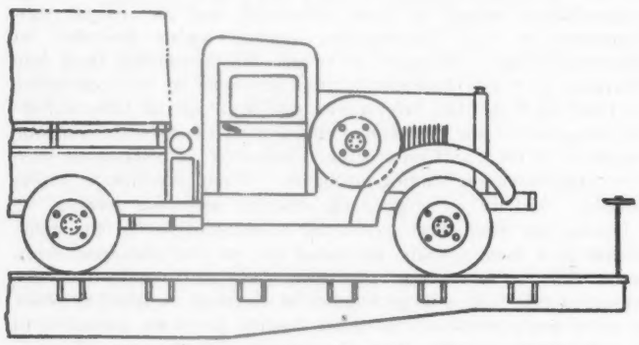
During this year the Ordnance Department, United States Army, requested that a special supplement be prepared to cover the loading of standard military vehicles not transported in complete trains accompanied by and under direct supervision of military personnel. This has been prepared and was issued June 1, 1944, for the guidance of all concerned. Again, as in the past, the Army personnel are to be complimented for their cooperation



Typical method of loading a light tank—Detail dimensions are given in Special Supplement 2 to the A. A. R. loading rules

in the preparation of this supplement. It is hoped that it will be of material assistance to the shippers and carriers in the loading and transporting of military vehicles.

(The committee here included a list of 10 general rules and 69 detailed figures revised wholly or in part, also 15 detailed figures added and 3 deleted wholly or in part as published in Supplements 1 and 2 of the loading rules. The committee also included proposed additional changes in five rules and 38 figures which



Military equipment should clear brake wheel as much as possible, but not less than 4 in. below and 6 in. above, on all sides

will become effective, after approval, with the next issue of the Loading Rules. The committee referred to the special supplement governing the loading of mechanized and motorized equipment which was published effective March 1 and included in the report a special supplement covering standard military vehicles not transported in complete trains which will be issued this month and later amplified to cover air force, engineering and artillery units).—Editor.

The report was signed by W. B. Moir, chairman, chief car inspector, Pennsylvania; C. J. Nelson, vice-chairman, superintendent interchange, Chicago Car Interchange Bureau; T. W. Carr, superintendent rolling stock, P. & L. E.; A. H. Keys, assistant superintendent car department, B. & O.; G. D. Minter, district car inspector, N. & W.; H. H. Golden, supervisor, A. A. R. Interchange & Accounting, L. & N.; H. F. Lyons, acting superintendent car department, Reading; H. J. Oliver, assistant superintendent motive power, D., T. & I.; F. A. Shoulty, assistant superintendent car department, C., M., St. P. & P., and K. A. Svenson, general car inspector, U. P.

The report was adopted.

Report on Geared Hand Brakes

Preliminary tests of geared hand brakes made in the summer of 1941 demonstrated a need for a revision of the A.A.R. specifications covering these brakes. It was also recognized that it would be necessary to set up a prescribed method of testing such brakes and to make provision for issuing certificates of approval. Suitable equipment was installed in the Draft Gear Testing Laboratory at Purdue University and to the present time the vertical-wheel-type hand brakes have been tested as shown in the table below and certificates of approval issued.

Horizontal and lever-type brakes have not yet been tested. When consideration was given to the actual procedure to be followed in testing the horizontal-wheel brake it was realized that the section relating to that type in the 1942 revision of the specifications for geared hand brakes could not be followed. Wheels on these brakes are 16 in. in diameter as compared with 22 in. which is universal on the vertical type. Using two hands on a horizontal wheel, a man exerts about 28 per cent as much braking force as the same man exerts with one hand on a vertical wheel. This was established by test and necessitates the recommendation of a change in a part of the last paragraph of Section 2 of the caption Horizontal Wheel Brake on page E-62-October 1, 1942, of the Manual of Standard and Recommended Practice. As proposed, the text would read, "Hand-brake leverage ratio selected must provide braking power of not less than 20 per cent of total weight of car plus nominal capacity based on a force of 220 lb. at the rim of a 16-in. diameter wheel or equivalent loading." The rule now reads, "—— based on a force of 125 lb. at rim of wheel."

Brakes Tested and Approved

Manufacturer	Type Designation
Ajax Hand Brake Company	Drawing 14038
Champion Brake Corporation	Drawing 1148
Champion Brake Corporation	Drawing 1124
Klasing Hand Brake Company	Drawing D-959
W. H. Miner, Inc.	Pattern D-2390-X
Superior Hand Brake Company	Drawing 566
Union Asbestos and Rubber Company (Equipment Specialties Division)	Drawing 3450-A
Universal Railway Devices Company	Drawing 4885
Universal Railway Devices Company	Drawing 5550
Universal Railway Devices Company	Drawing 5700

The periodic lubrication of geared hand brakes has been given consideration and the committee recognizes the value of proper lubrication and is of the opinion that provision should be made for some definite interval at which the brakes should be given thorough lubrication attention. No recommendation is made at this time pending further consideration of the subject.

It is recommended that a requirement be added to Interchange Rule 3 to provide that cars built new, or rebuilt (when not already equipped with geared hand brakes), on or after January 1, 1945, must be equipped with A.A.R. Approved Geared Hand Brakes.

The report was signed by R. G. Henley (chairman), general superintendent motive power, N. & W.; E. P. Moses, engineer rolling stock, N. Y. C.; J. P. Lantelme, general foreman Pennsylvania, and W. I. Cantley, mechanical engineer, Mechanical Division, A.A.R.

The report was accepted with the exception of a single correction; namely, the addition of a footnote to the last paragraph of the report stating that it refers to vertical-wheel hand brakes only. Necessary items in the committee's report were ordered referred to letter ballot.

Brakes and Brake Equipment

Air Brake Cylinder Packing Cups

In 1935, The Garlock Packing Company submitted samples of their brake cylinder packing cups No. 7752, with a request that the use of such cups be permitted on cars offered in interchange service. Through the services of a member railroad, a number of these cups were procured for test purposes and a sub-committee appointed to follow the tests. These cups were compared with present cups at temperatures of —30 deg. F. and +160 deg. F. as well as placed in actual road service for a number of years on caboose cars.

The sub-committee has made a favorable report on the service of these cups on the basis of the above tests, in which this committee concurs, and we recommend that the Garlock packing cups No. 7752 be permitted for use on cars offered in interchange service.

Tests of D-22 Control Valves

The HSC brake equipment, now being widely used on modern passenger cars and Diesel locomotives employing the D-22 type of control valve, was designed and constructed to produce satisfactory operation over long periods of time with the minimum amount of maintenance. This was accomplished by giving due consideration to such features as proper filtering of the air through efficient strainers and including other design features that have proved satisfactory in the AB valve.

In order to determine the condition of the parts of this equipment, after various months of road service, eight member railroads have agreed to participate in extended tests which will involve approximately 150 cars. These roads operate in all sections of the United States so that various climatic conditions will be encountered. This test program has been discussed with the director of the Bureau of Safety of the Interstate Commerce Commission and is also being actively participated in by the air brake manufacturers.

The purpose of these tests is to determine the proper periodic

cleaning time for this type of equipment and the fact that all equipment under test was given a complete test and inspection before being sealed indicates that reliable data will be obtained by the sub-committee which is closely following the tests.

Over 100 of these cars are now sealed and operated in service, some of which are almost due for their first inspection after 18 months of service.

This is submitted as information and a report of progress. A complete report will be prepared at the expiration of all tests with our recommendations.

AB Brake Piston Sleeve Lubrication

The present design of AB brake cylinder non-pressure head is a construction of pressed steel having a felt swab and grease for lubrication of the piston sleeve with three brass rings for excluding dirt from the cylinder past the piston sleeve. This construction has not proved entirely satisfactory from a maintenance and operating standpoint and the air brake manufacturers have designed an improved non-pressure head for this type of cylinder that has been in test service on one member road since 1938, and on another since 1940.

The improved non-pressure head differs from the present standard as follows: (a) Cast iron has been substituted for pressed steel. (b) Felt packing has been substituted for the metal seal rings around the hollow sleeve and is held firmly against the sleeve by the compression of the piston release spring exerted through a follower. This felt ring is saturated with oil at the time of application to lubricate the hollow sleeve. (c) A cast tubular projection extending slightly into the cylinder, restricts vertical vibration of the piston release spring, thus preventing the spring from contacting the hollow rod, and thereby marring it. This particular feature will overcome the condition mentioned by this committee in our report of April 28, 1941, as observed on the inspection and test of AB freight brake equipment on the Pennsylvania and the Santa Fe. Grease grooves for pressure lubrication of the packing cup have also been omitted as they did not prove practical and were never used.

The manufacturers advise that there will be no increase in the cost of the improved non-pressure head over the present pressed steel head in complete AB brake equipment or complete AB brake cylinder.

It is recommended that this improved design of non-pressure head for the AB brake cylinder be approved and the manufacturers be immediately authorized to proceed to manufacture it.

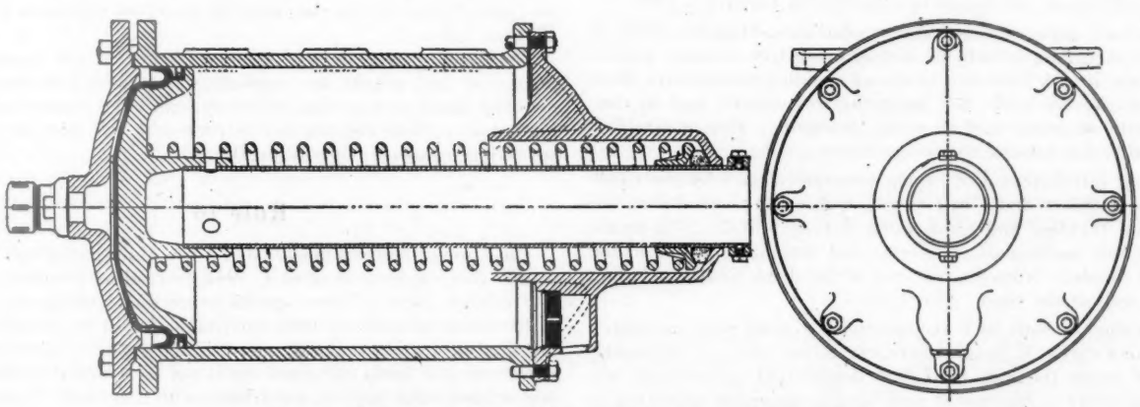


Fig. 1—AB brake cylinder with improved cast non-pressure head

Pipe Failures and Pipe Clamps

The investigation of broken pipes on freight cars by the joint sub-committee of the Car Construction Committee and this committee indicated that sufficient stress has not been given to the proper installation of the pipes when they were applied to the car.

In line with past practice of using the air brake manufacturers' maintenance instruction pamphlets, in which no changes are made without this committee's approval, it was suggested that their specification No. 2518 covering the installation of the AB freight car brake equipment be reviewed with the intent of treating it in the same manner as the maintenance instruction pamphlets.

The joint sub-committees have reviewed this specification and have made many recommendations therein to conform to A.A.R. requirements. They also recommend certain changes in the various plates of the supplement to the A.A.R. Manual in which the committee has concurred with certain slight modification.

The only confliction in the revised Specification No. 2518 with present A.A.R., recommended practice is that shown on Page E-15, Par. 6 of the manual, wherein it specifies that the retaining valve pipe should be supported by clamps not to exceed 6 ft. apart, adopted in 1899. Present car construction does not readily lend itself to this dimension and a dimension of "8 ft. or less" is recommended; this recommendation being concurred in by the Committee on Car Construction.

Curtailment of the Use of Rubber

From time to time we have received suggestions for the use of an extended nipple on air brake train line hose with a hose shorter than standard in order to conserve rubber. We have endeavored to retain the standard length of air brake hose (22 in.) in order to obtain the necessary flexibility and avoid excessive leakage at the hose coupling under various draft gear conditions by setting up a method of splicing hose which has aided considerably in the conservation of rubber. Tests conducted by one member road with an extended nipple on a shorter than standard hose, but having an overall length over coupling and nipple as standard, definitely proved that this method should not be permitted, as a partial passing of the couplers can move the angle cock to such an extent that the short length of hose coupled therewith can interfere with proper operation of the brake equipment.

The most outstanding change in equipment for conserving rubber is that of locating the angle cock in the present A.A.R. standard "preferred" location and it is recommended that this be done whenever conditions permit.

Parts for AB-4-12 Brakes

A considerable number of freight cars are in service equipped with the AB-4-12 brake equipment some of which are transporting critical and essential material. It is important that such cars should not be delayed in case of failure to any of the essential parts of this equipment. It is recommended that individual railroads carry such repair parts in stock as are necessary to protect the operation of cars so equipped over its line without unnecessary delays. The primary differences between the AB-4-12 and the AB-10 equipment consists only in the additional transfer valve and a combined 4-12 brake cylinder instead of a 10-in. cylinder.

The report was signed by R. E. Baker (chairman), principal road foreman, general supervisor of air brakes and train control equipment, B. & M.; J. P. Lantelme (vice-chairman), general foreman, Pennsylvania; W. H. Clegg, general superintendent of motive power and car equipment, G. T. W.; T. L. Burton, air brake engineer, N. Y. C.; C. H. Rawlings, superintendent of air

brakes, D. & R. G. W.; R. J. Watters, general air brake inspector, N. P.; O. H. Swan, supervisor air brake instruction, U. P.; R. E. Anderson, general air brake inspector, C. & O.; A. J. Pichetto, general air brake engineer, I. C.; R. N. Booker, general air brake inspector, Sou. Pac.; F. T. McClure, supervisor air brake, A., T. & S. F.; H. I. Tramblie, air brake instructor, C., B. & Q.

The report was accepted and necessary items referred to letter ballot.

Revisions of the Interchange Rules

During the year Cases 1799 to 1802, inclusive, have been decided and copies forwarded to the members.

With the concurrence of the Committee on Couplers and Draft Gears, it is recommended that effective dates of Rule 3 requirements prohibiting acceptance from owners of cars equipped with 5-in. by 5-in. couplers and prohibiting the interchange of cars equipped with Type E bottom rotary operated couplers having separate lock-lift lever and toggle be extended to January 1, 1946.

A new third paragraph is recommended for addition to Rule 16 to provide stenciling to indicate special protective coatings applied to the inside of tank cars, as a means of avoiding unnecessary damage when entering tanks for inspection or repairs, and in connection with steaming and cleaning operations; also to establish responsibility for damage to such coatings.

Based on satisfactory tests, upon recommendation by the Committee on Couplers and Draft Gears, it is recommended that the Emergency Welding and Limitations section of Rule 23 be modified to permit welding of transverse and shrinkage cracks in the shanks of couplers, from the rear end of the shank to and including the back wall of the horn.

Modification of Rule 94 is recommended to limit bills on authority of defect cards, in cases where car owner elects to dismantle instead of repair the cars, to A.A.R. depreciated value of car less salvage, in order to harmonize with similar provision appearing in Rule 112.

Modifications are recommended in Rule 98 to provide for marking of one-wear wrought-steel wheels which are turned account built-up metal or out-of-round, and to establish charges and credits.

Recommendation is offered for a modification of Rule 122, to provide a method for handling shipments of material ordered from car owner for repairs to his cars, effecting settlement of transportation charges, which should reduce billing and correspondence details.

No modifications necessitate submission to letter ballot.

All recommendations for changes in the Rules of Interchange submitted by members, railroad clubs, private car owners, etc., have been carefully considered by the committee and where approved, changes have been recommended.

Attention is again directed to the fact that the Arbitration Committee will not consider questions under the Rules of Interchange unless submitted in the form of Arbitration Cases as per Rule 123.

Rule 2

The committee recommends that the second paragraph of this rule be modified, effective August 1, 1944, as follows:

Proposed Form: Empty cars offered in interchange must be accepted, provided they conform to the requirements of Rule 3 and are in safe condition for movement, the receiving road to be the judge.

Reason: To prevent delays now being incurred in movement of bad-order cars to home shops for repairs. This recommendation has the concurrence of the Operating-Transportation Division.

Freight Rule 3

The committee recommends that effective dates for various requirements in the present rule as listed below, now set at January 1, 1945, be extended to January 1, 1946:

Section (b), Paragraph (7)—Brake levers: metal badge plates.

Section (b), Paragraph (9)—Braking power: braking ratio.

Section (c), Paragraph (10)—Couplers, having 5-in. by 5-i shanks.

Section (c), Paragraph (11)—Couplers having 5-in. by 7-i shanks.

Section (c), Paragraph (12)—Couplers, bottom rotary operate not equipped with assembled riveted type lock lift lever and toggl

Section (d), Paragraph (3)—Application of welded T or L se tion truck sides.

Section (t), Paragraph (10)—Tank cars; metal placard holder

Section (u), Paragraph (4)—Class E-3 cars not to be accepte from owner.

The matter of extension in effective dates for requirements i volving AB brakes and bottom-rod and brake-beam safety suppor has been referred to the General Committee.

The committee recommended modifications in Section (h) t provide for the recommendation in the report of the Committee o Geared Hand Brakes with respect to the requirement of approve hand brakes on cars built new or rebuilt on or after January 1 1945. This revision in final form will be issued later.

Rule 9

The Committee recommends that the third requirement opposit the item "General" in this rule be modified effective August 1 1944, as follows:

Proposed Form: Feet of lumber. Note: When flooring, sid planks or end planks are applied, show symbol M to indicat matched lumber, or symbol SE if straight edge lumber is applied

Reason: This information is necessary in order to compute board foot measure under Rule 102.

Rule 16

The Committee recommends that a new third paragraph be adde to this rule, effective August 1, 1944, to read as follows:

Proposed Form: When special protecting coatings are applie to the inside of tanks of tank cars, tank should be stenciled showing kind of coating and date (month and year) of application. I a destroyed or badly damaged car is not so stenciled settlement o depreciated-value basis in accordance with note under Paragraph 8 Section B of Rule 112 will not apply. To protect these specia coatings, stenciling at least 2 in. in height may be applied on side of dome, or on sides of tank near ladders, such as "Do Not Pu Steam or Boiling Water in This Tank," or such other caution a may be necessary to protect the coating. If, in connection with steaming, cleaning or entering tank for inspection or repairs, the coating is damaged and the car does not carry such caution stenciling, any damage to protective coating will be car owner's responsibility.

Reason: To avoid unnecessary damage to special protective linings in tanks of tank cars.

Rule 17

The Committee recommends that reference in Remarks column for Items 26, 28 and 30 of the table in Paragraph (c-2) of this rule be modified effective August 1, 1944, as follows:

Proposed Form: 26. No charge if applied to or with Type E coupler. If Type D-9 knuckle is removed, average credit shown in Rule 101 must be allowed.

28. No charge if applied to or with Type E coupler. If Type D-9 or D-11 knuckle is removed, average credit shown in Rule 101 must be allowed.

30. No charge if applied to or with Type E couplers. If Type E-9 knuckle is removed in good condition, secondhand credit must be allowed. If Type D-9 knuckle is removed, average credit shown in Rule 101 must be allowed.

Reason: To harmonize with Rule 101 and 104.

Rule 19

The Committee recommends the effective date of Item 14 of this rule, prohibiting the application of welded cast-steel truck side frames having T- or L-section compression or tension members, now set at January 1, 1945, to be extended to January 1, 1946.

Reason: To harmonize with extension recommended under Rule 3.

The Committee recommends that a new last item be added to this rule (which specifies materials that must not be used in making repairs to foreign cars), to read as follows:

Proposed Form: Pipe unions in hand rails of tank cars.

Reason: The use of pipe unions for this purpose is not permitted.

The committee recommends that a new item be added to this rule (which specifies materials that must not be used in making repairs to foreign cars), to read as follows:

20. Separate bottom rotary operation toggles and lock lifters of Type E couplers.

Reason: Application of the assembled unit type of lock lift lever and toggle (having the parts riveted together) is specified under Rule 18. Therefore, application of the separate toggles and lock lifters to foreign cars should be prohibited.

Rule 23

The Committee recommends effective date of the requirement prohibiting the welding of cast-steel truck side frames having T- or L-section compression or tension members, now set at January 1, 1945, be extended to January 1, 1946.

Reason: To harmonize with extension recommended under Rule 3.

The Committee recommends that paragraph (c-1) of the Emergency Welding Regulations and Limitations Section of this rule be modified effective August 1, 1944, as follows:

Proposed Form: (c-1) Transverse cracks, including shrinkage cracks in the shank of the coupler from the rear end of the shank to and including the back wall of the horn, may be welded. There is no limitation in the length or depth of cracks that may be welded.

Reason: To conserve critical material; as recommended by the Committee on Couplers and Draft Gears.

The Committee recommends that a new sub-section be added to Section C of this rule, effective August 1, 1944, to follow Fig. E-1 on page 98 of the current code, to read as follows:

Conversion of 6½-in. to 9⅛-in. butt couplers—(c-4) Couplers having 5-in. by 7-in. shank with 6½-in. butt may be converted to 9⅛-in. butt by welding metal shims on top and bottom of butts in accordance with the following regulations:

1—Shims should be cut to proper size—1$\frac{15}{16}$ in. by 5 in. by 5½ in.

2—Drill shims in pairs to match holes in related coupler butts.

3—Grind coupler butts to give neat seating of shims.

4—Bevel shims ⅜ in. at 60-deg. angle (or give J-weld preparation) all around contact face. No bevelling of coupler butt permitted.

5—Tighten shims to welding position on coupler butt by dummy pin and key, and exercise care to see that shim edges are flush with corresponding edges of coupler butt.

6—After shims are thus in position, weld to coupler butt by the shielded-arc electric method.

7—All sharp corners of applied shims must be removed by grinding. (See sketch following, designated as Fig. E-3.)

Reason: To conserve critical material; as recommended by the Committee on Couplers and Draft Gears.

Rule 44

The Committee recommends that a new sentence be added to present Note B following Section (4) of this rule, effective August 1, 1944, as follows:

Proposed Form: Note B.—The bending of steel center sills in excess of 2½ in. does not refer to sagging or bowing, but to definite buckling or abrupt bends. The term "between bolsters" means from rear edge of body bolster at one end of car to rear edge of body bolster at opposite end of car. Where both center sills are bent vertically or horizontally between body bolsters and bending is accompanied by definite buckling or abrupt bends, the damage shall be considered as being in excess of Paragraph 4(b) if the total deflection in each sill is in excess of 2½ in. measured vertically or horizontally between two adjacent crossbearers or between body bolster and first crossbearer.

Reason: To clarify the intent as to method of measurement for buckled sills.

Rule 60

The Committee recommends that Note 3 following Section (1) of this rule be modified to eliminate reference to brake-pipe strainer, effective August 1, 1944. (No change in list of approved parts except item of Brake Pipe Strainer is eliminated.)

Reason: As recommended by the Committee on Brakes and Brake Equipment, account former objectionable types of strainers now out of service.

Rule 66

The Committee recommends that Item 4 in Section (j) of this rule be modified, effective August 1, 1944, as follows:

Proposed Form: (j) Journal bearings shall be considered as requiring renewal:

4. When lining is worn through to brass either at crown or side.

Reason: To clearly indicate this provision is not applicable to bearings having the lining worn through at the fillet end only, as recommended by the Committee on Lubrication of Cars and Locomotives.

Rule 82

The Committee recommends that first paragraph of this rule be modified as follows:

Proposed Form: Rule 82. Cast-iron, cast-steel or 1-W wrought-steel wheels which take remount gauges shown in Figs. 7 and 8; and cast-iron or cast-steel wheels which take tread worn hollow limit for gauges for remounting shown in Fig. 8-A; and cast-iron or cast-steel wheels with tread defects as follows (a, b, c and d); shall be classed as scrap, except as otherwise provided for 1-W wrought-steel wheels in Paragraph (i-2) of Rule 98. These gauges or the following remount limits (a, b, c and d), must not be used for condemning wheels under cars. Wheels which do not take the remount gauges, or which have not reached the defect limits specified below (a, b, c and d), shall be classed as secondhand.

Reason: To clarify the intent with respect to 1-W wrought-steel wheels.

Rule 94

The Committee recommends that the last paragraph of this rule be modified, effective August 1, 1944, as follows:

Proposed Form: If the owner elects to dismantle the body or trucks, or both, charge may be made for such material, the renewal of which would have been required for the repairs covered by the defect card, but such charge to be confined to the actual material stated on card. Also, in case of items damaged which could have been repaired, labor charge may be made for such items on basis of labor for straightening or repairing same, but no labor charge is permitted for the R. and R. of any part and no other labor shall be charged in such cases except insofar as labor is already included in the A.A.R. prices for material.

However, under any of these circumstances bill on authority of defect card may not exceed the A.A.R. depreciated value of car, less salvage.

Reason: Responsibility of road issuing defect card should not exceed the depreciated value of car less salvage.

Rule 98

The Committee recommends that Paragraph (c-1) of this rule be modified, as follows:

Proposed Form: (c) (1) On basis of Rule 82, cast-iron, cast-steel, or 1-W wrought-steel wheels (except as otherwise provided as Paragraph i-2), when condemned by remount or other remount limits applicable, shall be credited as scrap when removed from service; responsibility for same being governed by responsibility for defective mate wheel. If mate wheel is not defective, the responsibility for wheel condemned by remount gauge or other remount limits, will be governed by responsibility for defective axle on which mounted. In such case when wheel is condemned by remount gauge or other remount limits, the specific cause for so condemning shall be stated on billing repair card. Wheels condemned by remount gauge or other remount limits must not be applied to foreign cars. Remount gauge or other remount limits must not be used for condemning wheels under cars.

Reason: To clarify the intent with respect to 1-W wrought-steel wheels.

The Committee recommends that Paragraphs (1) and (5) of Section (i) of this rule be modified, effective August 1, 1944, as follows:

Proposed Form: (i) (1) Charges and credits for one-wear wrought-steel wheels shall be on basis of prices new, secondhand and scrap, as per Items 194-C and 194-D of Rule 101; except that in cases of such wheels condemned for any defect, which can be reclaimed by turning as specified in the following paragraphs, charges and credits shall be on basis of service metal in the tread above the ¾-in. condemning limit, as measured by the leg of the A.A.R. steel wheel gauge without deducting the finger reading, plus the scrap value of metal inside the condemning limit as specified in Rule 101, but in no case to exceed secondhand value of the wheels. Price for such service metal shall be $1.52 per sixteenth inch for wheels 50-ton or less and $1.65 per sixteenth inch for 70-ton wheels. When crediting such wheels removed 0.7 hours labor per wheel should be deducted to cover the cost of turning.

Note.—In all cases of such wheels removed and condemned for any defect, the over-all thickness of tread before turning must be shown for each wheel at top of wheel and axle billing repair card, and also show in the "after turning" column the sixteenths of service metal (remaining after turning) measured as prescribed above. For each wheel applied which has been reclaimed by turning, the sixteenths of service metal measured as prescribed above must be shown in the "after turning" column.

5. The one-wear wrought-steel wheel is identified by marking "1-W" on back of flange near wheel number or manufacturer's name. When such wheels are turned as specified in Paragraphs (2), (3) and (4), or on account of being slid flat, the letter T (½ in. in height) must be legibly stamped on the wheel following the identification mark "A.A.R.-1W" on back face of the rim; this "1-WT" marking to be shown on repair records for such wheels when applied or removed. Wheels reclaimed by grinding must not be stamped "1-WT."

Reason: To clarify the intent with respect to one-wear wrought-steel wheels condemned account out-of-round, built-up tread and slid flat, which can be reclaimed by turning.

Rule 101

The Committee recommends that Item 58-B and note following be eliminated from this rule, effective August 1, 1944.

Reason: As recommended by the Committee on Brakes and Brake Equipment, account former objectionable types of strainers now out of service.

Rule 111

The Committee recommends that Sub-Item (9) of Paragraph (b) under Item 15 be eliminated from this rule, effective August 1, 1944.

Reason: As recommended by the Committee on Brakes and Brake Equipment, account former objectionable types of strainers now out of service.

Rule 112

The Committee recommends that note under Paragraph 8 of Section B of this rule be modified, effective August 1, 1944, as follows:

Proposed Form: Note: Settlement for special protective coatings applied to inside of tanks of tank cars for which per pound reproduction prices are specified, providing tank is stenciled showing kind of coating and date (month and year) of application, shall be additional and on basis of reproduction cost depreciated from date of application at two per cent per month on straight line basis, subject to a depreciation limit of 90 per cent. The same method shall be used in settling for cost of renewal of such coatings, if necessary, in a damaged tank that is repaired.

Reason: To provide equitable settlement for renewal of special protective coatings on inside of tanks of tank cars which are repaired.

Rule 122

The Committee recommends that first and second paragraphs of this rule be modified and Interpretation No. 3 eliminated, effective in the next supplement, as follows:

Proposed Form: Rule 122. Companies shall furnish to each other, upon requisition, materials for repairs of their cars on foreign lines. The material must be forwarded promptly by freight or express, charges prepaid from point of shipment in cases of car owner's defects. In cases of handling line defects, the material should be forwarded with transportation charges collect, in which event the repairing line may reclaim only for that portion of the movement over its line.

Requisitions for such material shall specify that same is for repairs of cars, giving car number and initial of such car, together with pattern number, sketch or other data to enable correct filling of requisition, also responsibility for the repairs.

Interpretation (3) (Vacant.)

Reason: To reduce correspondence and eliminate rendering bills covering transportation charges on material furnished by car owners for repairs to their cars on foreign lines.

Passenger Rule 2

The Committee recommends that the effective date of Paragraph (e) of this rule, with reference to equipping all-steel or steel underframe cars with cardboards or suitable receptacles for accommodation of defect and joint evidence cards; and also effective date of Paragraph (f) covering the application of brake shoe spark shields to passenger train cars having underneath exposed wood parts over the wheels, both requirements now being set at January 1, 1945, be extended to January 1, 1946.

Reason: The present situation justifies these extensions.

The report was signed by J. P. Morris (chairman), general mechanical assistant, A. T. & S. F.; J. A. Deppe (vice-chairman), superintendent car department, C. M. St. P. & P.; W. N. Messimer, assistant superintendent of equipment, N. Y. C.; L. Richardson, mechanical assistant to vice-president and general manager, B. & M.; G. E. McCoy, assistant general superintendent car equipment, Can. Nat.; E. L. Bachman, general superintendent motive power, Pennsylvania; A. E. Smith, vice-president, Union Tank Car Company, and M. F. Covert, general superintendent of equipment, General American Transportation Corporation.

The report was accepted except the revisions of Section (h) of freight-car Rule 3, modifications of which will be issued later.

Lubrication of Cars and Locomotives

The last published report of the committee was made in 1941; brief mimeographed reports have been made to the General Committee during the past two years. In this report, only such subjects as hold general interest or require action by the membership are covered.

Interchange Rule 66

(1) *Methods of Packing Journal Boxes.*—A revision of the standard specification for Journal Boxes, Standard Method of Packing, resulting from a year and a half of study is attached as an appendix to the report. It is largely a rearrangement of present instructions in the interest of continuity, the rewording of some sections and revision of others to incorporate the practices agreed to by the committee as conducive to best general practice for packing journal boxes on cars in interchange service. It is recommended that the revision be submitted as a letter ballot item. A mixture of 50 per cent new and 50 per cent renovated waste is recommended for packing with Specifications M-904, M-905, M-906 and M-910 remaining as the minimum requirements for the materials used in making up journal packing. Preparation of packing is to be as before with the exception that prepared packing in storage containers is to be turned over at least every 5 hours instead of every 24 as under the previous reading of the rule. If the packing is not turned over oil in the bottom of the container must be drawn off and poured over the top of the packing. The cleaning of journal boxes before packing is dealt with and the use of dust-guard plugs required in addition to the closely fitting box lids and dust guards previously mentioned in the rule. Packing procedures still prohibit the use of machine-made back rolls and, in addition, rolls tied with twine. The use of free oil in such boxes as do not appear to contain sufficient oil after boxes are repacked is also required.

(2) *Periodic Repacking of Journal Boxes—Increase in Time*

for Mandatory Repacking.—The matter of changing the present mandatory repacking from 15-14 to 18-17 months was intensively studied, as was the question of billing change from 9-14 to 12-17 months. The results of a survey conducted by the committee in June and July, 1943, are reported.

(3) *Clarification of Section (j), Item 4.*—This provision is not to be applicable to bearings worn through at the fillet end only and the language is changed to read, "(4) when lining is worn through to brass, crown and sides only."

Roller-Bearing Lubrication

Progress has been made in arranging for laboratory tests of roller-bearing lubricants which will be subjected to full journal load at speeds up to 100 m.p.h. with characteristics studied over a temperature range from sub-zero (starting) to 100 deg. F.

Journal-Box Lids

Revision of Specification M-120, Journal Box Lids, has been receiving study and it is planned to forward a revised specification to the General Committee with recommendation for submission to a letter ballot during the coming year.

Journal-Box Packing-Retaining Devices

The committee has kept in touch with developments in the use of devices suggested for holding packing in place and preventing waste grabs and member roads using them are encouraged to keep them in service to determine service life. However, no conclusions have been reached warranting recommendations for the mandatory use of such devices or the adoption of any device or devices of this class as A.A.R. standard practice.

Hot-Box Statistics

Monthly statements of freight-car hot-box records on all A.A.R. member roads have been compiled since September, 1942. A summary of these are presented in the table.

Dust Guards—General

Revision of Specification M-903, Dust Guards, recommended in 1941 has since been adopted by letter ballot. Much trouble has been experienced with dust guards on tank cars and the matter was handled by a circular letter to members and private car owners under date of April 24, 1944.

Hot Boxes—Causes and Prevention

This subject was studied and is continued on the docket as a live subject. A detailed report to the membership was circularized by the executive vice-chairman under date of July 21, 1943. The committee feels that the success of any program for controlling hot boxes is essentially dependent on advance preparation involving adequate supervision and working force at key points on each railroad and follow-through with more thorough checking and servicing of all boxes at these key points during the summer period.

Prevention of Accidents Due to Burned-Off Journals

The committee has given extensive study to the problems involved in this subject and have made recommendations looking to their solution. Briefly, these recommendations cover the carrying out of a research program involving study of the phenomena of serious overheatings culminating in burned-off journals and hot-box alarm devices for indicating such condition to train or engine crews before burn-offs develop.

The report was signed by J. R. Jackson (chairman), engineer of tests, M. P.; L. B. Jones (vice-chairman), engineer of tests, Pennsylvania; P. Maddox, superintendent car department, C. & O.; A. J. Pichetto, general air-brake engineer, I. C.; W. G. Aten, mechanical inspector, lubricating matters, C. B. & Q.; J. Mattise, general road foreman of engines, C. & N. W.; J. W. Hergenhan, assistant engineer, test department, N. Y. C., and, D. C. Davis, lubrication supervisor, A. T. & S. F.

The report was accepted and necessary items ordered referred to letter ballot.

Committee on Specifications for Materials

The Committee on Specifications for Materials has had under consideration, and have made the following changes and revisions in certain standard specifications and emergency specifications:

Specifications M-101-41, axles, carbon steel, for cars and locomotive tenders, carry, in Par. 23 (a) a sentence which determines the dimensions of the countersinks in the end of the axle. Owing to the fact that larger countersinks have been found desirable for large axles, and a different design of countersinks for roller bearing axles, this sentence as it now reads is in conflict with latest developments.

It was therefore decided to omit all reference to dimensions from the specifications, leaving them to be indicated by the appropriate committees handling designs. The changes involved in these specifications are as follows: Revised form 23—Workmanship.—(a) The axle shall conform to the size and shape specified by the purchaser. *Centers shall conform to the design and dimensions shown in the manual.*

Specifications M-112-42, steel bars, carbon, for railway springs were issued June 1, 1943, to include spring steel bars of 6 in. to 8 in. widths, which are not covered in the standard specifications M-112-42.

Specifications M-115-38, steel boiler and firebox for locomotives. (a) It is recommended the following change in these specifications be submitted to letter ballot: 6. Tension tests (a).—Change the tensile strength range of 52,000-62,000 lb. per sq. in. for Grade A firebox steel shown in table, to read: 55,000-65,000.

(b) Editorial changes have been made as follows: Title of specifications has been changed to read, "Steel, Carbon, Boiler and Firebox, for Locomotives."

Monthly Freight Car Hot-Box Statistics

as reported by A.A.R.

Month	Total freight car mileage			Total car set-outs*			Average miles per set-out*		
	1942	1943	1944	1942	1943	1944	1942	1943	1944
January	.....	2,999,962,588	3,293,864,472	....	7,760	5,978	.....	386,593	550,999
February	.....	2,865,616,217	3,174,542,468	....	8,698	6,442	.....	329,456	492,788
March	.....	3,272,300,869	.....	....	9,067	....	.....	360,902	.....
April	.....	3,233,014,225	.....	....	8,545	....	.....	378,452	.....
May	.....	3,412,690,321	.....	....	11,598	....	.....	294,147	.....
June	.....	3,231,415,378	.....	....	19,625	....	.....	164,658	.....
July	.....	3,430,981,134	.....	....	21,313	....	.....	160,981	.....
August	.....	3,462,317,281	.....	....	18,296	....	.....	189,239	.....
September	3,191,618,297	2,401,363,195	.....	13,941	12,203	....	228,938	278,732	.....
October	3,402,371,306	3,475,645,092	.....	9,204	7,945	....	369,662	437,463	.....
November	3,172,846,122	3,222,709,578	.....	5,833	5,081	....	543,948	634,267	.....
December	3,026,680,774	3,182,786,375	.....	5,237	4,968	....	577,942	667,532	.....
Total		38,190,802,253			135,099			4,282,422	

* Account hot-boxes.

1. Scope.—Add the word "carbon" after the words "two classes of" in the first line.

13. Weight.—In the table of permissible overweights insert the figure "14" in the first line covering plates 3/16 to ¼ in. in thickness, and 96 to 108 in. exclusive in width. Also amplify the table by addition of two columns "144 to 168, excl." and "168 or over." Add the following note: "Note.—Permissible variations in weight for individual plates shall be one and one-third times the amounts prescribed in this table."

(c) *Emergency Specification E-M-115-43* were issued June 1, 1943. To conform to the above recommendations in respect to changing the title of the standard specifications, it has been agreed that the title of the emergency specifications be changed accordingly, that is, to read as follows: "Steel, Carbon, Boiler and Firebox, for Locomotives."

(d) In connection with specifications covering boiler and firebox steel, attention is called to the index to Sec. A of the Manual. References to A.S.T.M. specifications for special grades of boiler and firebox steel have been included.

Specifications M-116-42, steel, structural, shapes, plates and bars.—In order to clarify certain paragraphs of these specifications, and to eliminate slight, unintentional discrepancies between this and equivalent A.S.T.M. specifications, the following editorial changes have been made:

Sec. III, Par. 6 (page No. 2): In third line of table a small (a) under Grade C column has been inserted.

Sec. IV, Par. 11 (page No. 4): The words "and dimensions" deleted.

Sec. IV, Par. 12: Corrected to read: "12. Except in cases of special agreement between the purchaser and manufacturer that the material shall be furnished recut to exact ordered dimensions, the variations in dimensions shall be in accordance with the 'Steel Products Manual'."

Specifications M-302-41, refined wrought iron bars, have been changed in Sec. III, Par. 5(a), (page No. 2): Note "C" under table in this paragraph.—The word "wear" corrected to read "area."

Specifications M-501-41, bearings, journal, lines, have been changed as follows: Sec. III. Permissible Variations, Par. 8, Gaging: Reference to sheet of the manual corrected to read "D-24." Sec. V. Marking, Par. 10: Fig. 1 on page 3 of the specifications omitted and the first sentence of Par. 10 changed to read as follows: "The bearings shall be cast with the mark as shown on sheet ED-24 of the manual, latest revision."

Emergency Specifications for Hose: Because of limitation orders issued by the War Production Board, covering the use of natural rubber, and substitution of synthetic rubber, it has been necessary to revise the emergency specifications for these products. These specifications are as follows: E-M-601-44—Hose, Air Brake and Train Air Signal; E-M-602-44—Gasket, Air Brake Hose; E-M-603-44—Hose, Air, Gas and Oxygen; E-M-604-44—Hose, Cold Water, Wrapped and Braided; E-M-605-44—Hose, Steam and Hot Water; E-M-606-44—Hose, Tender Tank.

Emergency Specifications E-M-607-44 have been issued annulling the present standard methods of tests for rubber goods and adopting the standard methods of the A.S.T.M.

Specifications M-906-39, new car oil have been changed to read: Sec. I, Par. 2: Item (3) corrected to read as follows: "(3) Pour Point, upper maximum—." Par. 4: Last line of this paragraph corrected to read: "Pour point test——."

New specifications covering machine bolts and nuts, identified as *M-125-44,* have been prepared. It is recommended that these specifications be submitted to letter ballot. The Locomotive Construction Committee and the Car Construction Committee have approved them.

In accordance with present practice, the following standard specifications, which had not been revised within the past six years, were reviewed, with the idea of bringing them up to date. No changes were recommended, and they are therefore identified as "Reaffirmed." These are as follows: M-301-37—Iron and Steel Chain; M-401-37—Brake Shoes.

The report was signed by T. D. Sedwick (chairman), engineer of tests, C., R. I. & P.; C. B. Bryant (vice-chairman), assistant to vice-president, Southern; F. Zeleny, engineer of tests, C., B. & Q.; H. G. Burnham, engineer of tests, N. P.; H. P. Hasse, engineer of tests, N. Y., N. H. & H.; J. R. Jackson, engineer of tests, Mo. Pac.; H. G. Miller, mechanical engineer, C., M., St. P. & P.; L. B. Jones, engineer of tests, Pennsylvania; W. R. Hiedeman, engineer of tests, B. & O.; W. F. Collins, engineer of tests, N. Y. C.; W. Bohnstengel, engineer of tests, A., T. & S. F.; R. McBrian, engineer standards and research, D. & R. G. W.

The report was accepted and necessary items ordered referred to letter ballot.

* * *

Rated tractive force, engine, lb.	34,000
Weigths in working order, lb.:	
On drivers	150,000
On front truck	39,800
On trailing truck	41,200
Total engine	231,000
Tender	185,000
Wheel bases, ft.-in.:	
Driving	13—0
Engine, total	33—8½
Driving wheels, diameter outside tires, in.	70
Cylinders, number, diameter and stroke, in.	2—20 x 2
Boiler pressure, lb.	250
Grate area, sq. ft.	45.6
Heating surfaces, sq. ft.:	
Firebox, includ. arch tubes	199
Tubes and flues	2,377
Evaporative, total	2,576
Comb. evap. and superheat.	3,320
Tender:	
Water capacity, Imp. gal.	8,000
Fuel capacity, tons	14½

The Canadian Pacific will replace many of its older passenger locomotives after the war—This one recently built at the Angus shops will be used as a design standard after mechanical changes dictated by its performance in regular service have been made

(Turn to next left-hand page)

NEWS

Steel Allocations for Third Quarter of 1944

THE Office of Defense Transportation, as claimant agency for the transportation industry under the War Production Board's Controlled Materials Plan, has been allotted for this year's third quarter 1,378,524 short tons of carbon steel with "proportionate amounts" of alloy steel copper and aluminum. As the announcement put it O.D.T.'s requests "were granted almost in full."

The carbon-steel allotment for freight cars is 305,000 tons, "enough to cover all orders on hand for freight-car production in the fourth quarter," when the third-quarter allotment will be used. It has been learned that the fourth-quarter orders call for a total of 16,300 cars. The allotment for locomotive production is 42,500 tons.

WPB Changes Allotment Schedules for Car Material

IN order to assure procurement of component parts to meet delivery schedules, the War Production Board has found it necessary to extend to seven months the so-called "lead time" between approval of the material schedules for freight-car construction and actual delivery of the cars, the new Railroad Car Builders Industry Advisory Committee was informed at its first meeting on May 25.

The government presiding officer for the committee was David W. Odiorne, chief of the rolling-stock section of the WPB Transportation Equipment Division. Members of the committee now are W. C. Bower, vice-president purchases and stores of the New York Central; T. M. Evans of the Mt. Vernon Car Manufacturing Co.; K. W. Fischer, assistant to the president of the Chicago, Burlington & Quincy; K. C. Gardner of the Greenville Steel Car Co.; R. L. Gillispie of the Bethlehem Steel Co.; C. A. Gill, vice-president operations and maintenance of the Reading; A. Van Hassel of Magor Car Corp.; T. P. Gorter of Pullman-Standard Car Manufacturing Co.; Frank A. Livingston of Ralston Steel Car Co.; J. F. McEnulty of Pressed Steel Car Co.; and R. A. Williams of the American Car and Foundry Co.

The committee was told by WPB representatives that the equivalent of 85,500 freight cars will be scheduled for 1944 production, including the carry-over from 1943's schedules. The figure, however, includes allocations to all claimant agencies, including the military services, their quotas of smaller cars having been converted for statistical purposes to equivalent standard cars. The actual production in 1943, including the "compensated units" representing military service allotments, was about 68,700 cars, they indicated.

The WPB representatives predicted that the overall freight-car production requirements in 1945 will be smaller than this year, depending on manpower conditions, the availability of components, and the success attained in maintaining the new "lead time" schedule. In setting up production programs for earlier periods a lead time of four months was considered adequate, but difficulties in obtaining components to meet delivery schedules upset this arrangement. It was indicated that the WPB will defer its authorization of material allotments to car builders until it determines that the builder has made arrangements to order his materials.

Members of the committee recommended abandonment of the quota system of planning freight-car production when this year's program is completed, pointing out that the situation has changed since the system was introduced in December, 1942, when orders on builders' books exceeded available materials or facilities.

Top Priority on Freon for Air-Conditioned Pullmans

THE Surgeon General's Office of the Army has granted a top priority on freon so that every Pullman sleeping car using that refrigerant will be made ready for instant use this summer for moving invasion casualties from seaports to hospitals. As a result, regular passengers will get the benefit of air-conditioned service on the cars when they are not in hospital-train service.

The decision to provide the freon for all sleepers requiring it for their air-conditioning equipment was made to avoid any delay in having air-conditioned cars near whatever port of debarkation would need them.

Rolling Stock Needs of Army Past Peak

BECAUSE Army installations of railway equipment within the United States have been substantially completed, and because most of the requirements of such equipment for overseas use have been anticipated, War Department expenditures for such purposes in the fiscal year 1945 will take a downward trend, Maj. Gen. Charles P. Gross, chief of transportation, informed a House appropriations subcommittee at recent hearings on the Military Establishment Appropriation Bill for the next fiscal year.

Further overseas requirements are based, he explained, on the needs of rail lines now under Army control abroad and the anticipated needs for the operation of railroads in conquered countries. "Consideration has been given to the expected demolition of a considerable portion of existing equipment," he said. The estimates submitted to the committee called for $90,000,000 for railroad equipment, based on requisitions from the military railway services to meet needs for movement forward in conquered territories. In addition, $118,000,000 for lend-lease railroad equipment was included in the Army's estimate of its fiscal 1945 requirements.

Western Railway Club Officers for 1944-45

AT the recent annual meeting and dinner of the Western Railway Club, held at Chi-

(*Continued on next left-hand page*)

Orders and Inquiries for New Equipment Placed Since the Closing of the June Issue

LOCOMOTIVE ORDERS

Road	No. of Locos.	Type of Loco.	Builder
New York Central	4	6,000-hp. Diesel-electric	Electro-Motive

FREIGHT-CAR ORDERS

Road	No. of Cars	Type of Car	Builder
Bangor & Aroostook	52	40-ton box	Magor Car Corp.
Chicago & Eastern Illinois	200	50-ton hopper	Mt. Vernon Car Mfg. Co.
Florida East Coast	50[1]	50-ton box	Magor Car Corp.
Pacific Fruit Express	500	Refrig.	Mt. Vernon Car Mfg. Co.
	500	Refrig.	Mt. Vernon Car Mfg. Co.
New York Central	1,000[2]	55-ton hopper	Pressed Steel Car Co.
	1,000[2]	55-ton box	American Car & Fdry. Co.
Western Pacific	350[3]	50-ton box	Mt. Vernon Car Mfg. Co.

FREIGHT-CAR INQUIRIES

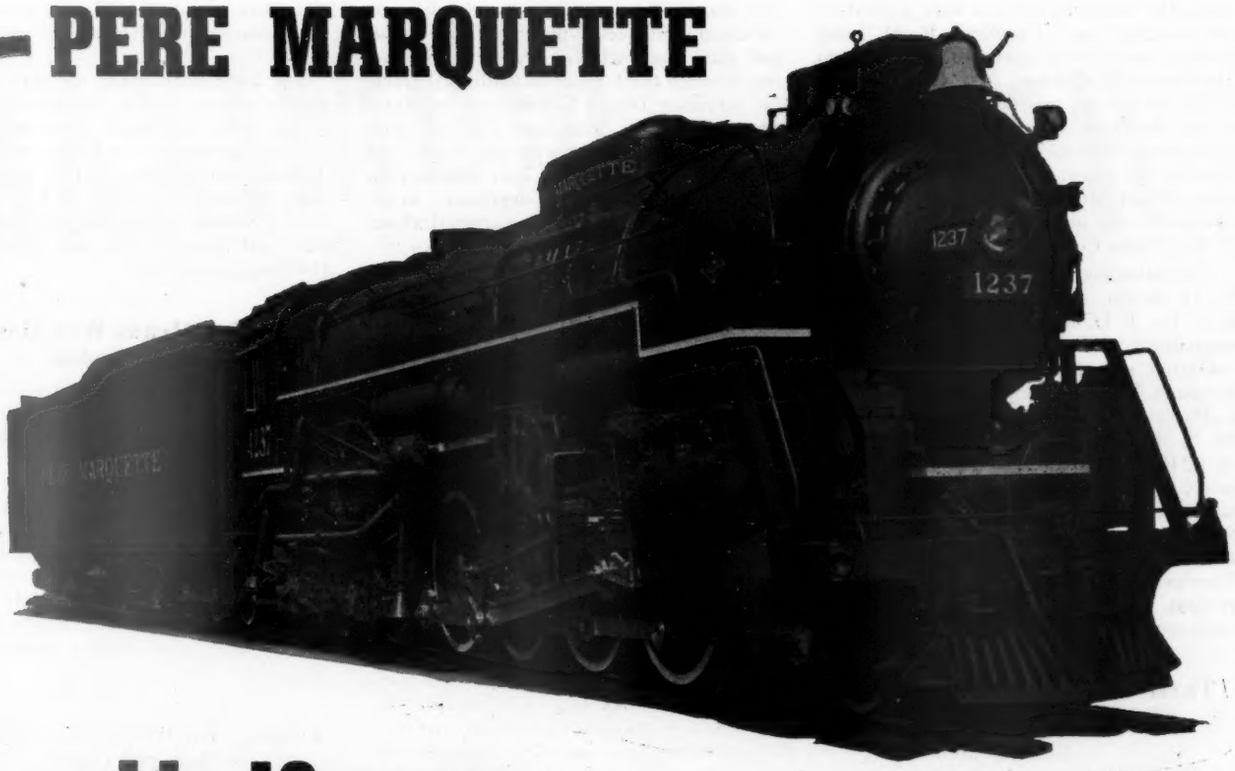
Road	No. of Cars	Type of Car	Builder
Donora Southern	50	70-ton hopper	
Kansas City Southern	175	50-ton box	
	100	70-ton hopper	
	25	70-ton covered hopper	
	100	90-ton covered hopper	
Missouri Pacific	25	70-ton hopper	
Western Pacific	100	70-ton gondolas	

PASSENGER-CAR INQUIRIES

Road	No. of Cars	Type of Car	Builder
New York, Chicago & St. Louis	5	Exp-bagg.	

[1] For express passenger-train service.
[2] Orders originally placed with Despatch Shops, Inc., as reported in the May issue.
[3] Order unconfirmed.

PERE MARQUETTE



adds 12 more

TO ITS FLEET OF 2-8-4 LIMAS

To handle its heavy fast freight traffic, especially between Chicago and Detroit, the Pere Marquette put fifteen 2-8-4 Lima Locomotives in operation in 1937, twelve additional ones in 1941, and has now added twelve more; making a fleet of 39 of this type placed in service in the last seven years.

Of the latest twelve, five are equipped with Locomotive Boosters. These have a main cylinder tractive power of 69,350 pounds and a total tractive power of 83,450 pounds. They have 26″ x 34″ cylinders and 69″ drivers.

LIMA LOCOMOTIVE WORKS INCORPORATED

LIMA LOCOMOTIVE WORKS, INCORPORATED, LIMA, OHIO

cago, the following officers were elected for the ensuing year: President, R. D. Long, general purchasing agent of the Chicago, Burlington & Quincy; first vice-president, J. M. Nicholson, assistant to vice-president of the Atchison, Topeka & Santa Fe; second vice-president, T. D. Beven, vice-president of the Elgin, Joliet & Eastern; treasurer, Albert Shiffers, Jr., Union Tank Car Company; executive secretary, E. E. Thulin, E. E. Thulin Company.

The following new directors were elected: R. D. Bryan, mechanical assistant, A. T. & S. F.; J. D. Rezner, superintendent car department, C. B. & Q.; W. H. Hillis, chief operating officer, C. R. I. & P.; W. A. Johnston, assistant general manager, I. C.; C. H. Kenzel, purchasing agent, E. J. & E.; W. S. Morehead, general storekeeper, I. C.; A. E. Biddle, Cardwell-Westinghouse Company; A. F. Becker, American Arch Company, Inc.; F. P. Biggs, American Brake Shoe Company; E. H. Mattingley, Standard Railway Equipment Company; J. I. Thompson, Ingersoll-Rand Company; J. E. Wright, Edward G. Budd Manufacturing Company.

Three Roads to Build Diesel Maintenance Facilities

Erie.—The Erie has awarded contracts for the construction of new Diesel servicing, maintenance and repair facilities at Marion, Ohio, which will involve a total expenditure of approximately $450,000. The facilities will include a combination maintenance and repair shop, approximately 220 ft. by 110 ft., with cleaning and reconditioning bays; an outside servicing platform for fueling locomotives from a 10,000-gal. fuel oil storage station, a half-ton per hour, semi-automatic sanding plant with 15,000 cu. ft. wet sand storage, and a locomotive washing plant. The new shop, which will be of steel frame construction, will have concrete foundations and floors, brick and glass-block exterior walls, two inspection and repair pits, and a 60-ton truck drop table.

Other features of the shop will be locomotive floor-level working platforms throughout the light maintenance section, a central lube oil storage and distribution plant, a distilled-water plant for replenishing Diesel-engine cooling-water supplies, and a 25-ton overhead traveling crane in the heavy repair section. A contract for all of the facilities, except the sanding plant, has been awarded the Hunkin-Conkey Construction Company, Cleveland, Ohio. The contract for the sanding plant has been awarded the Ross & White Company, Chicago.

New York, New Haven & Hartford.—The New Haven has awarded contracts for an addition to its wheel shop and an extension of the monorail structure at Readville, Mass., at estimated cost of $40,000, to the Tredennick-Billings Company of Boston, Mass.

Northern Pacific.—A contract has been awarded the Atherton Construction Company, Seattle, Wash., for the construction of a new Diesel maintenance shop at Auburn, Wash. The main building will be 75 ft. by 230 ft. with a 50-ft. by 121-ft. addition for a machine shop and a lean-to addition 109 ft. by 15 ft. for wheel storage. The shop will be of concrete and brick construction with steel columns and roof trusses and glass block window areas. It will have one through track and two additional tracks for servicing Diesel locomotives, an 80-ton drop table, 18 ft. long, and a 25-ton overhead traveling crane over one track. All track will be constructed over pits and the floor level outside will be depressed; in addition, platforms will be constructed alongside at the level of the locomotive floor.

The total cost of this project, including shop machinery and equipment to be furnished by the railroad, will be about $400,000.

Southern.—The Southern has authorized the construction of a Diesel-electric locomotive repair shop at Alexandria, Va., at an estimated cost of $297,766.

Pennsylvania To Enlarge Repair Facilities at Sunnyside

THE Pennsylvania plans to lay additional tracks and make other improvements to the passenger-car repair facilities at its Sunnyside yard, Long Island, N. Y. The additional facilities, which are required for the handling of a largely increased number of cars, will include the laying of 425 ft. of car repair track, installation of an additional drop pit with pneumatic jack for removing and replacing wheels under passenger cars, and the erection of a crane to handle wheels from the drop pit track. The yard now has facilities for repairing 6,200 cars annually, but increased traffic during the first four months of this year has made it necessary for the railroad to send 482 cars for repair to the Greenville car shops in Jersey City, N. J. With the completion of the additional facilities, all passenger car repair work will be done at the Sunnyside yard.

Average Carload in 1943 a New All-Time High Record

IN 1943 the average loading of carload freight reached a new record high of 41 tons per car, according to data complied by the Association of American Railroads. This made the fifth consecutive year in each of which a new high record was established. The average increase over 1942 was 0.9 tons per car. A new high record was set also in each individual commodity group.

Credit for the substantial saving in transportation thus obtained was assigned both to the effective enforcement of O. D. T. General Order 18-A and to the continued cooperation accorded the railroads by the shippers and receivers of freight, according to a statement by W. C. Kendall, chairman of the A. A. R. Car Service Division. It was pointed out that the handle the carload tonnage moved in 1943 at the average load prevailing in 1942 would have required 809,655 more carloads during the year, or an average of 2,600 for every working day. On the basis of the average turn-around time maintained in 1943, this heavier loading released for other service about 32,40 cars.

The average load for the principal commodity groups, 1943 as compared to the preceding year, was stated as follows: Products of Agriculture, 34.1 tons against 30.7 Animals and Products, 15.4 tons against 14.6; Products of Mines, 54.8 tons against 54.4; Products of Forests, 35.5 tons against 33.0; and Manufactures and Miscellaneous 31.4 tons against 30.1.

Miscellaneous Publications

Annual Proceedings of the Railway Fuel and Traveling Engineers' Association. T. Duff Smith, secretary-treasurer, 327 South La Salle street, Chicago 4. Price, $3.

Judge Hay Heads War Manpower Commission

THE War Manpower Commission has announced the appointment of Judge Charles M. Hay of St. Louis, Mo., as executive director and deputy chairman of the commission to succeed Lawrence A. Appley. Judge Hay, who recently has been general counsel of the W. M. C., formerly was counsel for the Railway Labor Executives Association, and in that connection was active in wage negotiations, particularly as chief counsel for the operating brotherhoods in the so-called Morse board proceedings in 1941.

Military Railroad Men Cited by General Clark

THE entire Military Railway Service in Italy, under the command of Brig. Gen. Carl R. Gray, Jr., has been awarded by Lt. Gen. Mark W. Clark, the Fifth Army Plaque and Clasp for "excellence in discipline, performance, merit," Allied Force M. R. S. Headquarters reports from Italy.

This recognition, which ordinarily is accorded only to units within the command of the Fifth Army, is the highest yet to be received by military railroaders, and in ceremonies timed to take place on his 55th birthday, General Gray received the award before members of his entire railroad staff and a number of officers of his operating and shop units. General Clark's deputy chief of staff presented the elaborate inlaid Italian wood tablet to the M. R. S. Director General, together with a letter from the Fifth Army's commanding general. General Clark had written, in part, as follows:

"I have regarded with mounting admiration the operations of the Military Railway Service in its support of the Fifth Army. . . . Time and again, crucial materials and reinforcements could not have been brought into action except for the outstanding performance of the Military Railway Service."

Pullman Employee Receives $2,275 for Suggestion

THE largest award so far to be paid under the suggestion system of the Pullman Company, $2,275, was received by John H. Prince, assistant storekeeper at the company's Calumet, Ill., shops on June 2. He proposed that the worn gear units used in drive generators and air-conditioning equipment on lightweight Pullman cars be reconditioned at the shops instead of being returned to the manufacturer for overhauling. Since the idea was placed in effect more than a year ago, the company has saved $23,228, after spending $17,951 for new tools and equipment for reconditioning 163 units.

(*Turn to next left-hand page*)

Santa Fe to Undertake Electronics Studies

THE Atchison, Topeka & Santa Fe plans to "fully explore and develop the use of electronics, particularly in the application of carrier and radio type communication to railway service in terminal and yard operations, between the front and rear of trains, between trains en route and dispatchers, on work equipment during emergencies, for control of train operation from a fixed point, for remote control of switches from locomotives, and for bridging gaps during wire line prostrations." To carry out the studies, L. R. Thomas, system telegraph engineer, has been appointed electronics engineer. A sketch of Mr. Thomas' career appears in the Personal Mention columns.

"The Steam Locomotive"—A Correction

IN the review of the second edition of this book by Ralph P. Johnson on page 272 of the June issue the price is incorrectly given; it is $5.

Bottom Rod and Brake Beam Safety Supports

THE A.A.R., Mechanical Division, has notified all car owners in a circular letter dated June 23 of the following modification of Interchange Rule 3, Par. (b-8), effective July 1, 1944: "(b) (8) Bottom rod and brake beam safety supports, A.A.R. recommended practice, or A.A.R. approved equivalent, required on all cars built new or rebuilt on or after August 1, 1933. Effective January 1, 1945, the foregoing requirement will also apply to all cars. In interchange."

(Note eliminated).

Rock Island Gets Permits for Radio Stations

THE Federal Communications Commission on May 30 granted application of the Chicago, Rock Island & Pacific for four construction permits for experimental Class 2 radio stations to be used in conducting tests of radio communication under actual operating conditions in the railroad yards and on trains in Chicago and west to Lincoln, Nebr.

The Rock Island, the FCC announcement said, "has informed the commission that an actual program of experimentation will be undertaken to develop factual information regarding the use of very high frequency circuits and systems as a means of providing communication between the following points in railroad service: (1) End-to-end of trains; (2) two-way yard-to-trains, engines or cabooses; (3) two-way yard-to-yard; (4) two-way dispatcher-to-trains, engines or cabooses; (5) two-way brakeman or flagman-to-trains, engines or cabooses."

Radiotelegraph and radiotelephone emission is authorized, including the use of both amplitude modulation and frequency modulation. Frequencies authorized are within the bands 30 to 40 megacycles and 100 to 400 megacycles, with a maximum power of 10 watts.

The announcement further pointed out that since these stations will be operated at fixed locations, as well as on moving trains, it was necessary for the applicant to request construction permits, inasmuch as stations on railroad rolling stock only may be licensed without the stations having been previously authorized under construction permits.

Captain Price Transferred from Holabird

CAPT. C. G. PRICE, JR., superintendent of the Holabird Transportation Corps Railroad Repair Shops, Holabird Signal Depot, Baltimore, Md., has been transferred to another post. Captain Price reported for duty at Holabird as a Second Lieutenant on April 7, 1941; became a First Lieutenant on July 13, 1942, and a Captain on April 21, 1943. One of his first assignments was the overhauling and modernizing of a number of locomotives which had been at the peak of their operating during the construction of the Panama Canal prior to its opening in 1914. Many times during the past two years when rush deliveries were required on repaired locomotives Captain Price, who is qualified in the operation not only of steam locomotives but also of Diesel-electric and gas-mechanical locomotives, has acted as engineman in their deliveries to relatively distant points. He had learned to operate a steam locomotive at the age of 12.

Captain Price was born on May 31, 1919, at Harrisonburg, Va. He received a Bachelor of Science degree in mechanical engineering at the Virginia Polytechnic Institute in 1940 and was then commissioned a second lieutenant in the Coast Artillery, Reserve. He was mechanical engineer of the Chesapeake Western at Harrisonburg when called to active duty with the Army on April 7, 1941. He is a member of the American Society of Mechanical Engineers, the American Railway Engineering Association, and the Locomotive Maintenance Officers' Association.

The shops at Holabird are the largest of the Army's permanent rail equipment repair shops. During one week in April of this year more locomotives were received there for repair than were repaired at Holabird during any one of the three years 19 to 1940. A ceremony celebrating the sho ping of the one-hundredth locomotive w held there on May 25.

Capt. C. G. Price, Jr.

A. S. M. E. Discusses Car Materials at Pittsburgh

AT the semi-annual meeting of the Ame can Society of Mechanical Engineers, h at the William Penn Hotel, Pittsburgh, P on June 19 to 22, inclusive, the subject modern structural materials for railw cars was discussed at a joint session the Railroad division and the Metals E gineering division on the afternoon of t second day. The meeting was presid over by J. G. Adair, chairman of the Ra road Division, and mechanical engine Bureau of Locomotive Inspection, Wa ington, D. C. J. H. Romann, chairman the Metals Engineering Division, presid during part of the session.

Three formal papers on the subject of t meeting were presented in sequence and f lowed by a general discussion. These pape included The Development and Trend Modern Structural Materials for Railro Rolling Stock, by S. H. Badgett, mechanic engineer, Pressed Steel Car Company, In Pittsburgh, Pa.; Structural Material f Railroads, by H. W. Gillet and S. L. Ho Battelle Memorial Institute, Columbu Ohio, and Use of Aluminum in Railwa Construction, by A. H. Woollen, railwa division engineer, Aluminum Company America, Pittsburgh. Mr. Badgett's pap analyzed the characteristics of various typ of steel, magnesium and aluminum as us in railway rolling stock. He emphasiz the improvements in steel-making practi and said that when heat treatment does n give the desired physical properties, t use of alloys at somewhat increased co must be resorted to. The second pape read by Dr. Hoyt, also discussed the use modern materials in railway equipment, i cluding cars and locomotives, and stresse the important part which recent metallu gical developments have played in securi the most efficient use of these material Mr. Woollen confined his remarks to t use of light alloys, primarily aluminum i railroad rolling stock in which it has passe the experimental stage. He said that fab ricating methods have now been large standardized and present no particular di ficulties to equipment builders.

In the discussion which followed presenta tion of these three papers several member commented on the rigid deflection limit i present A.A.R. passenger-car specification which they said presents an unnecessar hardship to car designers who want to us either aluminum alloys or stainless steel a the principal structural material. It wa recommended that individual car builder specialize in the respective types of con struction for which they have the necessar shop equipment and perfected fabricating methods. In attaining minimum car weights it was pointed out that the present relatively heavy weight of most car specialties con stitutes a definite challenge to the manu facturers of this equipment.

Following the general discussion of ma terials utilized in building railway equip

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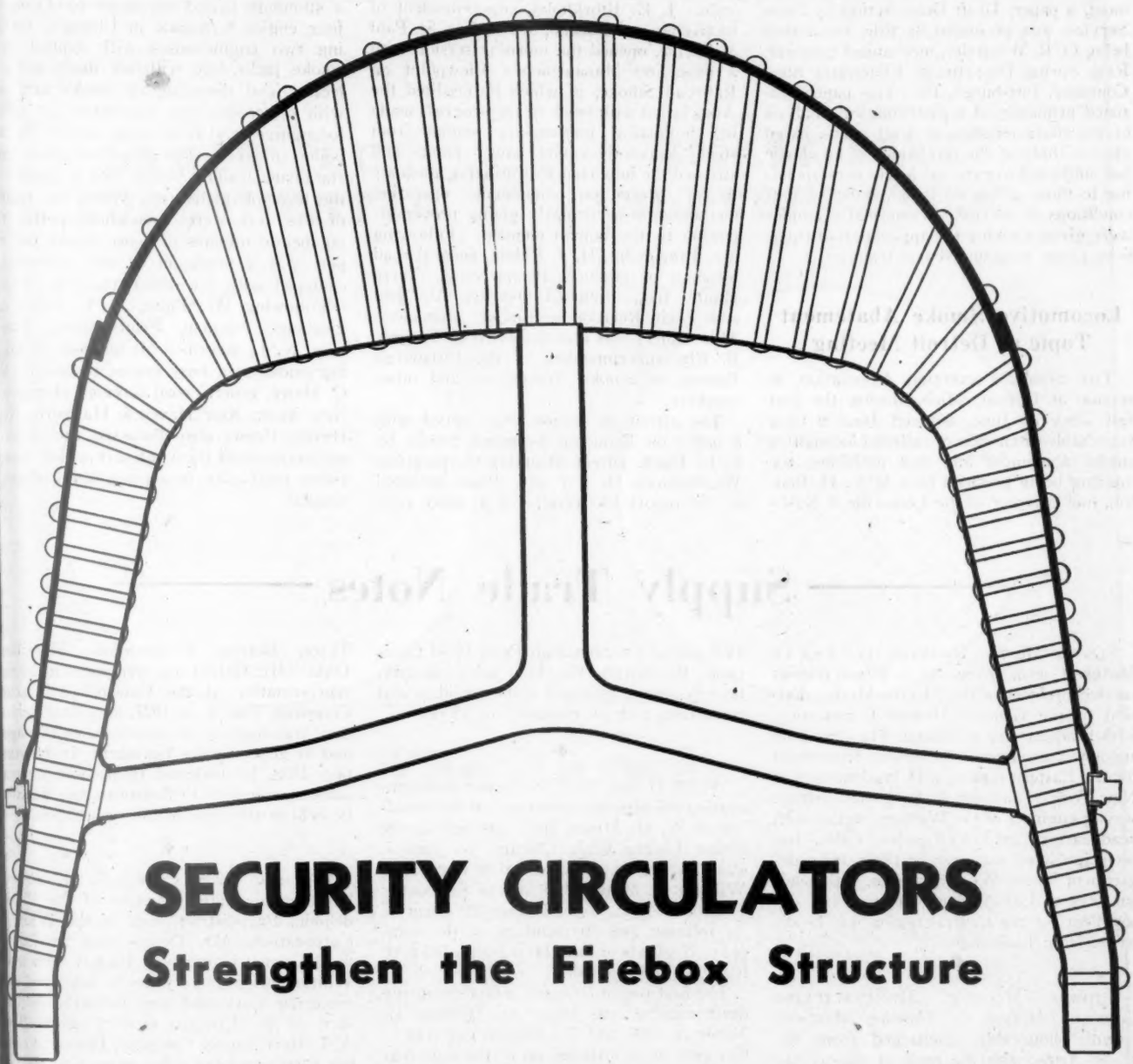
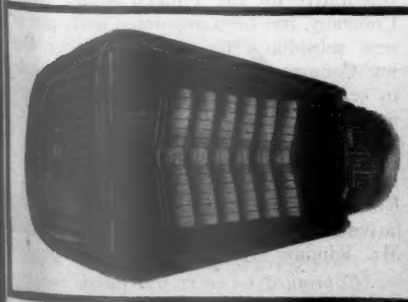


SECURITY CIRCULATORS

Strengthen the Firebox Structure

In addition to providing a positive flow of water over the CENTER of the crown sheet, Security Circulators act as struts in bracing the crown and side sheets, strengthening the firebox against extreme distortion.



AMERICAN ARCH COMPANY, INC.

SECURITY CIRCULATOR DIVISION

NEW YORK CHICAGO

ment, a paper, Draft Gear Action in Train Service, was presented by title, the author being O. R. Wikander, mechanical engineer, Ring Spring Department, Edgewater Steel Company, Pittsburgh, Pa. This paper consisted primarily of a mathematical analysis of the characteristics of draft gears, based upon a study of the mechanics of an elastic bar subjected to external forces corresponding to those acting on trains under various conditions of service. Numerical examples were given showing the application of equations given to assumed test trains.

Locomotive Smoke Abatement Topic at Detroit Meeting

THE Smoke Prevention Association, in session at Detroit, Mich., during the first full week of June, devoted June 8 to a roundtable discussion of railroad locomotive smoke abatement and fuel problems, the meeting being presided over by E. D. Benton, fuel engineer of the Louisville & Nashville. J. E. Bjorkholm, superintendent of motive power, Chicago, Milwaukee, St. Paul & Pacific, opened the morning session with a paper on Management's Viewpoint on Railroad Smoke, in which he credited the Association with much of the progress made in eliminating unnecessary smoke from steam locomotives and power plants and stressed the importance of utilizing adequate smoke prevention equipment, operating methods and particularly giving proper attention to the human element. Following Mr. Bjorkholm, H. J. Riddle, general road foreman of engines, Pennsylvania, Terre Haute, Ind., discussed Overfire Air Jets and Their Relation to Smoke Abatement. This subject was also discussed by Sumner B. Ely, superintendent of the Pittsburgh Bureau of Smoke Prevention, and other speakers.

The afternoon session was opened with a paper on Reducing Terminal Smoke by L. G. Plant, Direct Steaming Corporation, Washington, D. C. Mr. Plant included in his report the results of a study over a 40-month period of smoke conditions at four engine terminals in Chicago, including two enginehouses with typical open smoke jacks, one with air ducts for collecting and disposing of smoke and one with direct-steaming equipment for filling locomotives and developing practically full boiler pressure, with steam supplied from stationary boilers, before fuel is ignited in the locomotive firebox. While the results of this test were somewhat spotty, the number of minutes of dense smoke per report was a minimum at the enginehouse equipped with the direct-steaming system.

Following Mr. Plant, P. T. Tolin, enginehouse foreman, Pennsylvania, Jersey City, N. J., described his methods of abating smoke at a busy engine terminal. W. C. Shove, general road foreman of engines, New York, New Haven & Hartford, New Haven, Conn., also discussed this subject and emphasized the vital part which supervision must play in accomplishing desired results.

Supply Trade Notes

ELECTRO-MOTIVE DIVISION, GENERAL MOTORS CORPORATION.—*C. L. Olsen,* district service engineer of the Electro-Motive division of the General Motors Corporation, with headquarters at Miami, Fla., has been appointed manager of the service department for the Eastern region, with headquarters at New York. *Thorwald O. Robertson,* district service engineer of the Western region, with headquarters at Los Angeles, Calif., has been appointed manager of the service department for the Western region, with headquarters at Los Angeles. The service department for the Central region will be directed from LaGrange, Ill.

◆

THOMAS MACHINE MANUFACTURING COMPANY.—*Edgar C. Thomas,* who was recently honorably discharged from the U. S. Army with the rank of major, has been elected vice-president of the Thomas Machine Manufacturing Company of Pittsburgh, Pa. Before the war he was in charge of the company's Chicago office and later of its Philadelphia, Pa., office. As vice-president he will direct sales, working through the Pittsburgh and Philadelphia offices, and with particular emphasis on foreign markets.

◆

H. K. PORTER COMPANY.—*M. D. Bensley* has been appointed general manager of the H. K. Porter Company's three plants at Mt. Vernon, Ill., the Mt. Vernon Car Manufacturing Company, the Wheel Foundry Division of Mt. Vernon Car, and the J. P. Devine Manufacturing Company. Mr. Bensley was graduated from Michigan University and began his business career with Farrar & Trefts, Inc., where he served as superintendent of the boiler and tank shop for a number of years. In 1917 he purchased and operated the Frontier Bronze Corporation of Niagara Falls, N. Y. He subsequently was employed for several years as a manufacturers' agent in North Carolina and in 1929 joined the Shenango Penn Mold Company, Pittsburgh, Pa., in a sales capacity, later becoming assistant to the president and continuing with the company for 15 years..

◆

W. H. MINER, INC.,—A dinner commemorating the fiftieth anniversary of the founding of W. H. Miner, Inc., was held at the Union League Club, Chicago, on June 7. Participating in the celebration were Mrs. William H. Miner, chairman of the board; President A. P. Withall, Vice-President G. A. Johnson and 80 members of the company, 27 of whom have been associated with it for 25 years or more.

The first patent covering a tandem spring draft rigging was issued to William H. Miner in 1891 and 2½ million car sets of this gear were installed up to the time that friction draft gears were developed to meet the demands of heavier modern railway service. From 1906 to date, about 2½ million car sets of Miner friction gears have been supplied for railway use.

Miner products, including certified draft gears and hand brakes, truck spring snubbers, side bearing, car door fasteners and safety locking pins are now manufactured at four plants, located at Buffalo, N. Y., Beacon Harbor, Mich., Bramford, Ont., and Montreal, Que. This company established its first testing laboratory in 1909 and extended these facilities until at the present time it has six drop hammers of 9,000 and 27,000 lb. designs, three of which are located at the plant at Buffalo, N. Y., two at the Chicago research laboratory and one at Montreal, for use in checking the capacities of draft gears manufactured in Canada.

◆

TYSON BEARING CORPORATION. — *Ed. R. Galvin* has resigned as general sales manager of R. G. LeTourneau, Inc., Peoria, Ill., to become president and a director of the Tyson Bearing Corporation, Massillon, Ohio. Mr. Galvin was appointed a district representative of the Caterpillar Tractor Company, Peoria, in 1927, and later served that organization as eastern sales manager and as general sales manager. In November, 1938, he resigned to become general sales manager of LeTourneau, the position he held at the time of his resignation.

◆

WHITING CORPORATION.—*G. M. Dennis* has been appointed manager of the Philadelphia, Pa., district office of the Whiting Corporation. Mr. Dennis was graduated from Cornell University. He has been with Whiting for over 15 years in sales and engineering work and was formerly on the staff of the Chicago district office. The A. T. Herr Supply Company, Denver, Colo., has been appointed sales representative for railroad equipment in that territory by the Whiting Corporation.

◆

HANNA STOKER COMPANY.—*Fred K. Murphy,* formerly superintendent of equipment of the Cleveland, Cincinnati, Chicago & St. Louis, has been appointed vice-president of the Hanna Stoker Company at Cincinnati, Ohio.

◆

TIMKEN ROLLER BEARING COMPANY.—*Jules A. Morland,* former New York representative for the Timken Roller Bearing Company, has been appointed manager of a new subsidiary, the Timken Roller Bearing Company of South America, organized to service Timken bearings now operating in South America.

◆

HENNESSY LUBRICATOR COMPANY.—*C. E. Kinnaw* has been appointed special representative of the Hennessy Lubricator Company. Mr. Kinnaw was formerly sales engineer

(*Continued on next left hand page*)

with the Sunbeam Electric Manufacturing Company and more recently with the transportation equipment division of the War Production Board.

◆

AMERICAN LOCOMOTIVE COMPANY.—*J. J. Smith,* supervisor of shops for the Baltimore & Ohio for the past fifteen years, has been appointed general superintendent of the Schenectady, N. Y., plant of the American Locomotive Company. Mr. Smith joined the B. & O. as a machinist at Connellsville, Pa., in 1911, and subsequently was appointed assistant foreman, general foreman, shop inspector, and supervisor of shops.

◆

AIR REDUCTION COMPANY; UNITED STATES INDUSTRIAL CHEMICALS COMPANY. —*Dr. Lawrence W. Bass,* director of the New England Industrial Research Foundation, has been appointed associate director of research of the Air Reduction Company and the United States Industrial Chemicals Company.

◆

SCULLIN STEEL COMPANY.—*R. C. Geekie,* sales representative of the Scullin Steel Company, St. Louis, Mo., since 1936, has been appointed assistant to the president in charge of sales to assume the duties of the late *G. L. L. Davis,* former vice-president in charge of sales.

COOPER-BESSEMER CORPORATION. — *William F. Lamoreaux* has been appointed research metallurgist of the Cooper-Bessemer Corporation. Mr. Lamoureaux, who for the past three years has been director of research for the Meehanite Metal Corporation, will divide his time between the company's plants at Mount Vernon, Ohio, and Grove City, Pa.

SUPERHEATER COMPANY, LTD.—*C. A. Odell,* vice-president of the Superheater Company, Ltd., of Montreal, Canada, has been elected president to succeed *F. A. Schaff,* who becomes chairman of the board. *H. E. Brown,* who has been general manager since March, 1934, and assistant to Mr. Odell, has been elected vice-president in charge of operations. *G. S. Thomson,* manager of the Sherbrooke, Que. works,

F. A. Schaff

has also been elected a vice-president.

C. A. Odell was formerly associated with the Canadian Pacific. He joined the Superheater Company, Ltd., in 1919 as assistant to the vice-president and subsequently served as assistant secretary and assistant treasurer, manager and general

G. S. Thomson

manager. He was elected vice-president in 1926.

F. A. Schaff was senior vice-president of the company from July, 1920, to July 1940. In the latter month he was elected president. He is also president of the associate company, the Superheater Company of New York.

G. S. Thomson, who joined the company in May, 1916, had been manager of the Sherbrooke works for the past 24 years.

◆

YOUNGSTOWN STEEL DOOR COMPANY; CAMEL SALES COMPANY.—*A. G. Dohm* and *L. F. Duffy,* formerly vice-presidents of the Camel Sales Company, (wholly owned subsidiary of the Youngstown Steel Door Company), have been elected vice-presidents of the Youngstown Steel Door Company, with headquarters at Chicago. *J. D. Ryan,* formerly with the Ryan Car Company, has become associated with the sales department of the Youngstown Steel Door Company. *E. C. Browne,* assistant vice-president of the Camel Sales Company, has been elected vice-president of the company, with headquarters as before at Chicago, and *L. C. Voss,* assistant vice-president, has been elected assistant to the president.

◆

W. F. BOYLE has been appointed manager of gas-turbine activities at the Steam Division of the Westinghouse Electric & Manufacturing Company, Philadelphia, Pa. Mr. Boyle, who is a graduate of Pratt Institute, has been with the Steam Division and the Middle Atlantic sales district of the Westinghouse Company since 1927 when he completed the company's graduate student training course at East Pittsburgh. Prior to his new assignment he was manager of the Marine Section of the Steam Division Application Department and before that was manager of the Division's sub-contracting department.

◆

BALDWIN LOCOMOTIVE WORKS, STANDARD STEEL WORKS DIVISION—*John D. Tyson* has been elected divisional vice-president in charge of the Standard Steel Works Division. Mr. Tyson has been a member of the Standard Steel Works staff since 1923 when he joined the metallurgical department upon completion of his studies at Pennsylvania State College. He subsequently was appointed assistant metallurgical engineer, chief metallurgist in 1931, and manager of sales and metallurgy in 1943.

◆

BALDWIN LOCOMOTIVE WORKS.—*Frank K. Metzger* has been elected vice-president in charge of sales of the Baldwin Locomotive Works. Mr. Metzger first became associated with Baldwin in 1909 when he was employed by the Standard Steel Works Company, a wholly owned subsidiary. He was appointed successively sales manager, vice-president in charge of sales, and, in 1930, vice-president and general manager in charge of operations and sales of the Standard Steel Works. Shortly after Standard Steel became a division of the parent company, he was elected divisional vice-president of Baldwin in charge of that division.

Frank K. Metzger

C. A. Odell

WORTHINGTON PUMP & MACHINERY CORPORATION.—The Worthington Pump & Machinery Corporation has purchased the Electric Machinery Manufacturing Company of Minneapolis, Minn. The Electric Machinery Company's major lines include synchronous motors for direct drive for power plant and industrial machinery and electric generators for steam and internal combustion engines. The company will continue to operate independently of the other Worthington activities under its present executive management.

◆

AMERICAN CAR AND FOUNDRY COMPANY.—*S. F. Udstad* has returned to the American Car and Foundry Company as assistant to the general mechanical engineer

S. F. Udstad

with headquarters at Berwick, Pa. For the past two years Mr. Udstad was assistant chief of the rolling stock section, Transportation Equipment Division of the War Production Board. He served in the army during the first World War, and became a graduate of Missouri University in 1922 with a degree in mechanical engineering. He was appointed assistant city engineer at St. Charles, Mo., in 1922 and from 1923 to 1924 worked with the Moreno-Burkham Construction Company in St. Louis, Mo. He joined the American Car and Foundry Company in St. Charles in 1924 as car draftsman and was transferred to the general engineering office at Berwick in 1932, assigned to calculations of stress and strain, railroad car development division. Mr. Udstad was appointed assistant mechanical engineer in charge of passenger cars in April, 1938.

◆

AMERICAN CAR AND FOUNDRY COMPANY.—*Charles J. Hardy*, chairman of the board of the American Car and Foundry Company, was awarded the honorary degree of Doctor of Laws by De Paul University on June 7. Mr. Hardy is a graduate of Columbia University Law School. He was general counsel for the American Car and Foundry Company for 25 years prior to his election as president in March, 1933.

◆

OXWELD RAILROAD SERVICE COMPANY.—*Muscoe Burnett, Jr.*, sales manager of the Oxweld Railroad Service Company, Chicago, has been elected vice-president in charge of sales. Mr. Burnett was born at Paducah, Ky., and was educated at the University of Virginia. Since 1920 he has been associated with various units of the Union Carbide & Carbon Corporation. His first position was with the Oxweld Acetylene Company in New York. Four years later he was transferred to the Export department of the Union Carbide Company

Muscoe Burnett, Jr.

and still later was appointed assistant division manager of the Linde Air Products Company at Chicago. In October, 1935, he became assistant sales manager of the Oxweld Railroad Service Company and on February 1, 1937, was appointed sales manager.

◆

REYNOLDS METALS COMPANY.—*James E. Friend*, deputy associate director of the Mechanical Section of the Division of Railway Transport of the Office of Defense Transport of the Office of Defense Transportation, with headquarters at Chicago, has been appointed sales manager of the Railway Supply division of the Reynolds

James E. Friend

Metal Company at Chicago. Mr. Friend was born at Rawlins, Wyo., on July 9, 1890. He entered the employ of the Union Pacific in 1906, serving successively as a call boy, engine dispatcher, machinist apprentice and machinist. In 1912, he entered the service of the Texas & Pacific as a machinist at Texarkana, Tex.; in 1915 became a foreman, and in 1916 general foreman at Toyah, Tex., and Baird. In May, 1918, he entered military service and served as a first lieutenant with the 50th Engineers overseas. He returned to the Texas & Pacific in August, 1919, as general foreman at Baird, Tex., and in December, 1916, was transferred to El Paso, Tex. In September, 1921, he left the Texas & Pacific to become foreman of the Los Angeles & Salt Lake at Milford, Utah, and returned to the Texas & Pacific in January, 1922, as assistant master mechanic at Marshall, Tex. In July, 1922, he was appointed master mechanic and as such served at Alexandria, La., Shreveport, Big Spring, Tex., and Ft. Worth. In October, 1942, Mr. Friend was granted a furlough from the Texas & Pacific to serve as deputy associate director in the Mechanical Section of the Office of Defense Transportation at Washington, D. C. In January, 1943, he opened an office in Chicago to supervise the activities of the section in the Western region.

◆

CHICAGO RAILWAY EQUIPMENT COMPANY.—*E. H. Leisch*, district sales manager of the Adams & Westlake Company, has been appointed Eastern sales manager of the Chicago Railway Equipment Company. Mr. Leisch was born on December 1, 1898, and in 1926 entered the employ

E. H. Leisch

of the Adams & Westlake Company. From 1926 to 1936, he was manager of the New York office and district sales manager at New York. In the latter year he was transferred to Chicago, where he was located until his recent appointment.

◆

SYMINGTON-GOULD CORPORATION.—*J. A. Sauer*, executive vice-president of the Symington-Gould Corporation, has been elected president with headquarters at Rochester, N. Y., to succeed *Charles J. Symington*, who is now chairman of the board. Mr. Symington continues to direct the general policies of the company from New York.

C. J. Symington was graduated from Amherst College. He began his career as an apprentice with the West Virginia Pulp

(*Continued on second left-hand page*)

ALL TYPES OF GMD

Allied

DIESEL POWER
for Victory

THE Boston and Maine has recently strengthened its motive power by the addition of four General Motors 5400 Hp. Diesel Freight Locomotives (with fourteen more to follow) and now joins the fast growing group of railroads using GM Triple Diesel Service — Freight — Passenger — Switcher.

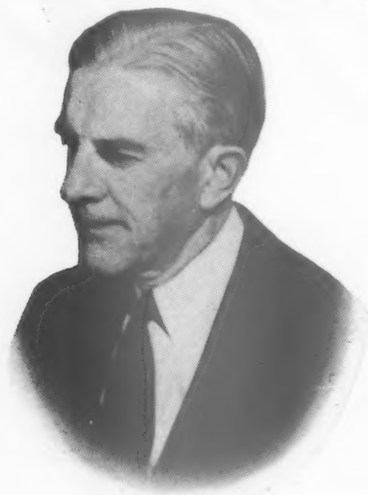
★ *LET'S ALL BACK THE ATTACK – BUY MORE WAR BONDS* ★

ELECTRO-MOTIVE DIVISION
GENERAL MOTORS CORPORATION LA GRANGE, ILLINOIS, U.S.A.

BOSTON AND MAINE

GENERAL MOTORS LOCOMOTIVES

& Paper Company in 1902; was appointed assistant manager of the Sayre, Pa., Stamping Company in 1903, and manager of the Cayuta Manufacturing Company of Sayre in 1905. He was assistant manager of T. H. Symington & Company at Baltimore, Md., from 1907 to 1911; general sales



Charles J. Symington

agent for the company at Chicago in 1911-12, and vice-president in charge of sales, with headquarters in New York, from 1912 to 1919. He was elected president of the Symington-Gould Corporation in 1919.

J. A. Sauer began his career as an office boy and stenographer in the Baltimore,

J. A. Sauer

Md., office of the original T. H. Symington & Company 35 years ago. He will remain at Rochester, N. Y., during the present emergency, or as long as may be desirable in view of the critical labor shortage in the company's plants at Rochester and Depew, N. Y.

◆

CHICAGO MALLEABLE CASTING COMPANY.—*Charles A. Benz,* manager of the Railroad division of the Chicago Malleable Casting Company, and its subsidiary, the Allied Steel Castings Company, has been promoted to general sales manager of both companies, with headquarters as before at Chicago.

Union Carbide & Carbon Corporation

The following have recently been elected presidents of Union Carbide & Carbon Corporation subsidiaries:

CARBIDE & CARBON CHEMICALS CORPORATION; CARBIDE & CARBON CHEMICALS, LTD.—*Dr. Joseph G. Davidson.*

NATIONAL CARBON COMPANY; CANADIAN NATIONAL CARBON COMPANY.—*Arthur V. Wilker.*

ELECTRO METALLURGICAL COMPANY; ELECTRO METALLURGICAL COMPANY OF CANADA; HAYNES STELLITE COMPANY; MICHIGAN NORTHERN POWER COMPANY; UNION CARBIDE COMPANY OF CANADA.—*Francis P. Gormely.*

ELECTRO METALLURGICAL SALES CORPORATION.—*John D. Swain.*

BAKELITE CORPORATION.—*James W. McLaughlin.*

LINDE AIR PRODUCTS COMPANY; PREST-O-LITE COMPANY; DOMINION OXYGEN COMPANY, LTD.; PREST-O-LITE COMPANY OF CANADA.—*Stanley B. Kirk.*

UNITED STATES VANADIUM CORPORATION.—*John R. Van Fleet.*

Francis P. Gormely, president of the group comprising Electro Metallurgical, Haynes-Stellite, Michigan Northern, and Union Carbide of Canada, is a graduate

Francis P. Gormely

of Michigan University (1909) where he received a degree in electrical engineering. Immediately upon graduation he joined the Union Carbide Company of Sault Ste. Marie, Mich., as an electrician, and has served that company continuously in various production and executive capacities since that time.

John D. Swain, president of the Electro Metallurgical Sales Corporation, is a graduate of DePauw University (1912). He joined the Union Carbide Sales Compan at Chicago in 1915. He served in th Army air corps during the first world wa He resumed his sales work when the wa ended and has been engaged since with th company in sales executive and administra tive capacities.

James W. McLaughlin, president Bakelite, is a graduate, with a degree mechanical engineering, of Illinois Un versity (1914). After a short time as engineer with the Peoples Gas Light Coke Company at Chicago, he joined th Prest-O-Lite Company. He has been charge of major production operations the industrial gases and chemicals com panies of the corporation continuously sin

James W. McLaughlin

that time. Mr. McLaughlin will direct of the plastics operations of units of t corporation, including the plastics divisi of the Carbide & Carbon Chemicals Co poration.

Stanley B. Kirk, the newly elected pre dent of Linde Air Products, Prest-O-Li and the Dominion Oxygen Company, a graduate of Wisconsin University (191 He joined the Union Carbide Sales Co

Stanley B. Kirk

pany in 1915 and since that time has be responsible for sales and sales mana ment in the gas group of companies the corporation.

Army-Navy "E" Awards

Fansteel Metallurgical Corporation, North Chicago, Ill. Second award.

Ardco Manufacturing Company, North Bergen, N. J. Fourth star.

AMERICAN BRAKE SHOE COMPANY.—*Roy L. Salter* has been appointed chief operating officer of the Southern Wheel division of the American Brake Shoe Company, with the title of works manager. *W. C. Appleby*, former operating manager, has been appointed assistant to the division president, and *D. E. Hensley* has been appointed assistant works manager.

Roy L. Salter was graduated from the Alabama Polytechnic Institute and joined the Southern Wheel division as assistant foreman at the Sayre, Pa., plant in 1924. He was appointed superintendent in 1927, transferred to the Portsmouth, Va., plant in the same capacity in 1929 and returned to Sayre in 1936. He was given a leave of absence in 1937 to enter the service of the Association of Manufacturers of Chilled Car Wheels where he remained for five years, returning to Southern Wheel in New York as general superintendent in 1942.

Obituary

ARTHUR P. HAGAR, sales representative, northeastern district, for the Safety Car Heating & Lighting Company, died on June 8.

◆

GEORGE E. SCOTT, manufacturers' agent at St. Louis, Mo., died suddenly in that city on June 1. Mr. Scott was purchasing agent of the Missouri-Kansas-Texas from 1914 to 1939, and vice-president and assistant sales manager of the Scullin Steel Company from the latter date until May 15 of this year, when he resigned to become a manufacturers' agent. Mr. Scott was chairman of the Purchases and Stores division of the Association of American Railroads from 1932 to 1935.

◆

DONALD SYMINGTON, president of the McConway & Torley Corporation, died on May 22. Mr. Symington was born in Baltimore, Md., in 1882. After attending McCabe University School and Amherst College, he joined the T. H. Symington Company, as sales representative in Chicago in 1905. He was a captain in the first world war and served in France as chief munitions officer of the first army, American Expeditionary Force. He joined McConway & Torley in 1931.

ALBERT H. ARMSTRONG, retired General Electric Company engineer widely known for his work in railroad electrification, died May 31. Mr. Armstrong was 73 years of age. He was a graduate of the Worcester Polytechnic Institute in 1891 with a degree in electrical engineering. He began his career as a member of the student

Albert H. Armstrong

engineering course of the Thomson-Houston Electric Company, Lynn, Mass. When General Electric was organized through the merger of Thomson-Houston and the Edison Electric Company in 1892, Mr. Armstrong was moved to Schenectady, N. Y. He was transferred to the engineering department in 1894 and three years later joined the railway engineering department. He subsequently was appointed assistant engineer of the railway engineering department, and in June, 1929, was appointed consulting engineer of the transportation engineering department. He retired November 1, 1930.

◆

OLIVER WADE SPENCER, vice-president of the Southern Wheel Division of the American Brake Shoe Company, died June 18. Mr. Spencer was 52 years old. He was a graduate of Yale University in 1917 and began his career as a salesman in South America for the Standard Oil Company. He joined the American Brake Shoe Company in 1922 as an apprentice at the Mahwah, N. J., plant. He was appointed sales representative for the Brake Shoe and Castings and the Southern Wheel Divisions in St. Louis, Mo., in 1924 and elected vice-president of the wheel division in 1939. He was transferred to the New York office in 1942.

◆

J. THOMAS TALBOT, an executive of the American Brake Shoe Company, died on June 6. Mr. Talbot was 47 years of age. He began his career as an apprentice in the Mt. Clare shops of the Baltimore & Ohio. During the first World War he was attached to the railroad engineers unit overseas. He joined the sales department of the American Brake Shoe Company as

J. Thomas Talbot

inspector in June, 1920, and was appointed sales representative covering the southeast in January, 1922. He returned to New York in 1935 and was appointed assistant vice-president of the Brake Shoe & Castings division in January, 1937. He became vice-president in charge of sales for both the Brake Shoe & Castings and the Southern Wheel divisions in September, 1940, and was elected vice-president and a director of the Dominion Brake Shoe Company, Ltd., in January, 1944. Mr. Talbot had been an active member of the New York Railroad Club since 1936.

Personal Mention

General

L. J. PRENDERGAST has been appointed superintendent communications of the Baltimore & Ohio at Baltimore, Md.

GLENN LEE has been appointed chief mechanical inspector of the Pere Marquette, with headquarters at Grand Rapids, Mich.

T. L. NICHOLS, superintendent of motive power of the Atlanta & Saint Andrews Bay with headquarters at Panama City, Fla., has been appointed general superintendent in charge of the transportation and the mechanical departments, with headquarters at Dothan, Ala. The position of superintendent of motive power has been abolished.

T. LARRABEE, chief mechanical inspector of the Pere Marquette at Grand Rapids, Mich., has retired.

L. R. THOMAS, system telegraph engineer of the Atchison, Topeka & Santa Fe, has been appointed electronics engineer. Mr. Thomas will study and develop electronics particularly in application of carrier and radio type communication in terminal and yard application between the front and rear of trains, etc. Mr. Thomas was born in Odessa, Mo., on May 18, 1911. He attended grammar and high school and later completed a course in electronic engineering at the National Schools, Los Angeles, Calif. He has operated amateur radio station and has been a student of electronics for the past twelve years. First employed by the Santa Fe as an apprentice operator at Needles, Calif., in September, 1928, he graduated in September, 1930, and served as operator until June, 1934, when he became wire chief. In July, 1939,

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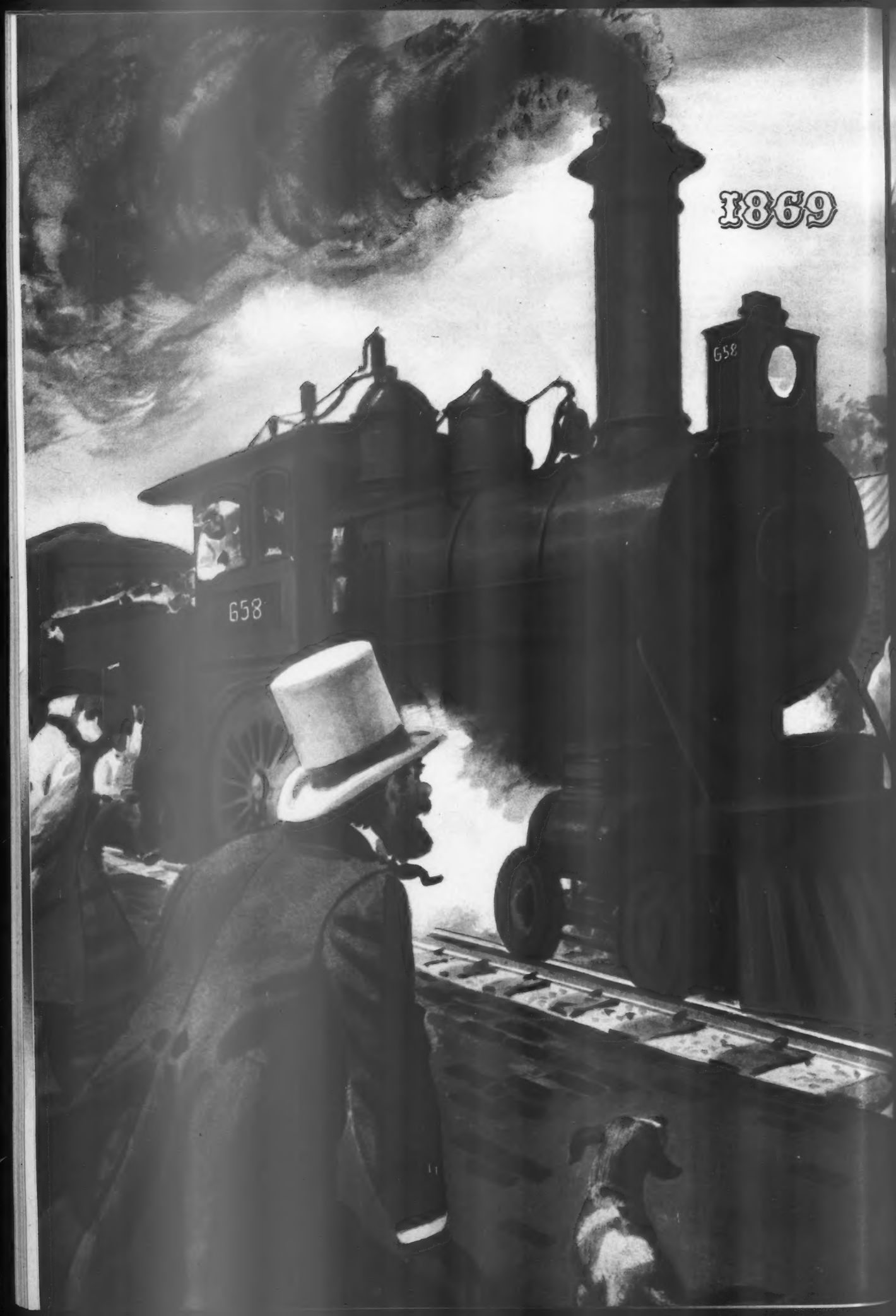
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he became telegraph and telephone supervisor for the Santa Fe with headquarters at Topeka, Kan. He was appointed system telegraph engineer in July, 1941, and in that capacity he handled the installation of the Santa Fe's telegraph and telephone carrier systems. In the course of this work he has developed intricate circuit designs, in one of which he used vacuum tubes in place of electrically operated mechanical relays.

A. R. DAVIS has been appointed superintendent of fuel conservation and lubrication of the Missouri Pacific, with headquarters at St. Louis, Mo.

ROY F. WALKER, locomotive designing draftsman of the Canadian National, has been appointed locomotive mechanical engineer, with headquarters at Montreal, Que. Mr. Walker, a native of Goderich, Ont., received his mechanical and electrical engineering education at Toronto, Ont., and entered railroad service as a machinist ap-

R. F. Walker

prentice of the Grand Trunk at York enginehouse, Toronto. Later he worked as a machinist at Ottawa, Ont., Stratford and Mimico, until 1909, when he became a locomotive fireman at Belleville, Ont. The following year, Mr. Walker joined the staff of the Canadian Locomotive Company at Kingston, Ont., as a draftsman and, in 1915, enlisted with the Queen's Battery, Kingston, as a gunner, later serving, while overseas, as a sapper with the Royal Canadian Engineers. On demobilization in 1919, Mr. Walker joined the Montreal Locomotive Works at Montreal as a designing draftsman, which position he relinquished in September, 1928 to return to the Canadian National as locomotive designing draftsman.

KENNETH CARTWRIGHT, mechanical engineer of the New York, New Haven & Hartford, has been appointed chief mechanical engineer, with headquarters as before at New Haven, Conn. Mr. Cartwright was born on March 14, 1890, at West Epping, N. H., and received a B. S. degree in mechanical engineering from the Massachusetts Institute of Technology in 1912. He entered the service of the New Haven as a material inspector on June 1, 1914, remaining in that position until June 15, 1918, when he left to serve as a lieutenant (j.g.) in the United States Navy. Mr. Cartwright was released from his duties with the Navy on January 26, 1920, and on February 1 of that year re-entered the service of the New Haven as assistant to engineer of tests. He became general mechanical inspector on December

K. Cartwright

1, 1923; assistant mechanical engineer on June 1, 1925, and mechanical engineer on September 16, 1935.

JOSEPH WILLIAM BAILEY, whose appointment as superintendent of motive power and car equipment, Southern Ontario district, of the Canadian National, with headquarters at Toronto, Ont., was announced in the June issue, was born at Liskeard, Cornwall, England, on February 15, 1885. He entered the mechanical department of the Canadian National as a fireman at Fort

Joseph William Bailey

Erie, Ont., on February 3, 1904. He later served as a machinist and leading hand machinist at Fort Erie and in November 1917, became locomotive foreman at Lindsay, Ont. Five years later he became general foreman at Deering Me.; in 1930 night foreman at Longue Point, Ont., and in 1934 locomotive foreman at Allendale, Ont. Mr. Bailey was transferred to the Montreal, Que., motive-power shop in May, 1935, where he served as general foreman and later superintendent. He was transferred to the Stratford, Ont., motive-power shop as superintendent in February, 1939, in where he remained until his recent appoint ment as superintendent of motive power a car equipment, Southern Ontario district.

Master Mechanics and Road Foremen

WILFRID F. HEINBACH, master mechan of the Reading division of the Readi retired on April 1.

WILLIAM R. DOWNS has been appoint master mechanic of the New York Ce tral at Avis, Pa.

HARRY C. SANDERS has been appoint master mechanic of the Reading divisi of the Reading ,with headquarters at Rea ing, Pa.

J. J. FREIBOLT, superintendent of fu conservation and lubrication of the Missou Pacific at St. Louis, Mo., has been a pointed road foreman of engines, with hea quarters at Little Rock, Ark.

FRED P. CROUMEY has been appointed a sistant master mechanic, Providence di sion, of the New York, New Haven Hartford.

HARRY S. RAUCH has retired as assista master mechanic of the New York Centr at Dewitt, N. Y. The position has be abolished.

J. B. HALLIDAY, master mechanic of t Chicago, Petoskey and Detroit and Gra Rapids divisions of the Pere Marquet at Grand Rapids, Mich., has retired.

WILLIAM G. RINGLAND has been a pointed master mechanic of the New Yo Central at Dewitt, N. Y., with jurisdi tion over the Dewitt and Syracuse, N. Y territories, and the St. Lawrence division

G. L. LINDQUIST, shop superintendent the Pere Marquette at Grand Rapids, Mic has been appointed master mechanic of t Chicago, Petoskey and Detroit and Gra Rapids divisions, with headquarters Grand Rapids.

Car Department

NORRIS C. HOOPER, superintendent of c shops of the Canadian National at Tra cona, Man., has retired after 36 year service.

B. F. BROWN, car shop foreman of t Canadian National, with headquarters Transcona, Man., has been appointed s perintendent of car shops, with headqua ters at Transcona.

FREDERICK J. GIBSON, general car for man of the Central of New Jersey at Eli abethport, N. J., has had his title change to general car inspector.

GEORGE C. VOGEL, general foreman the Elizabethport, N. J., shops of the Ce tral of New Jersey, has been appointe superintendent of the car department. M Vogel was born at Buffalo, N. Y., on D cember 15, 1894. In June, 1910, he e tered the employ of the Lake Shore Michigan at Buffalo, where he worke as a messenger and in various clerical p sitions for two years. He then entere the transportation department of the Del

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ware, Lackawanna & Western, and later the mechanical department of the Pennsylvania, where he served in many supervisory capacities over a period of approximately nine years. Mr. Vogel then served the Boston & Maine successively as piecework supervisor in the mechanical depart-

George C. Vogel

ment and assistant inspector of operations in the president's office. In 1927 he became general piecework supervisor, mechanical department, of the Central of New Jersey and in March, 1929, foreman of the Elizabethport car shops.

Obituary

GEORGE S. HUNTER, at one time head of the motive-power department of the International-Great Northern, died at Denver, Colo., on April 14 at the age of about 85 years. Mr. Hunter, after 61 years of railroad service, retired in August, 1935. He entered the service of the Philadelphia & Reading in 1873 as an apprentice. Later he became a general foreman in the employ of the International-Great Northern and in 1906, general master mechanic. In 1908 he was appointed division master mechanic of the Kansas City Southern at Pittsburg, Kan., and in December, 1910, assistant master mechanic of the Missouri Pacific-Iron Mountain System at Jefferson City, Mo. A short time later Mr. Hunter became master mechanic of the Missouri, Oklahoma & Gulf at Muskogee, Okla.; in 1918 division foreman of the Colorado & Southern at Cheyenne, Wyo., and in 1922 master mechanic at Trinidad, Colo. From 1930 until his retirement in 1935 he was division foreman.

W. S. BUTLER, division superintendent of the Chesapeake & Ohio, with headquarters at Russell, Ky., died suddenly in that city on June 5. Mr. Butler was born in Yorkshire, England, on October 5, 1874. He entered railway service in 1894 and until 1898 was a machinist in the employ, successively, of the C. & O. at Clifton Forge, Va., the Norfolk & Western, the Southern, and the Atlantic Coast Line. In 1899 he returned to the Chesapeake & Ohio at Huntington, W. Va. Later he was transferred to Handley, W. Va., and still later became enginehouse foreman and general foreman. In July, 1904, he was promoted to the position of assistant master mechanic at Lexington, Ky., and in January, 1905, was transferred to the Hinton division, with headquarters at Hinton, W. Va. In November of the same year he became assistant master mechanic of the Huntington shops with jurisdiction over all departments, and in June, 1910, was appointed master mechanic. In October, 1911, Mr. Butler was given jurisdiction over the entire Huntington division, and in August of the following year the Hinton division was also added to his jurisdiction. His headquarters were at Hinton. In January, 1913, he was appointed master mechanic of the Huntington, Logan, Big Sandy and Ashland divisions, with headquarters at Huntington; on November 15, 1920, assistant to the general superintendent of the Western division, and in November, 1923, division superintendent at Russell.

PAUL MADDOX, superintendent car department of the Chesapeake & Ohio, died on June 13 at Richmond, Va.

BYRON E. NEVINS, retired master mechanic of the Virginian at Victoria, Va., died on June 9 at Richmond, Va.

CHARLES J. GERBES, master mechanic of the Erie at Marion, Ohio, died on April 16. Mr. Gerbes became a machinist in the employ of the Erie at Secaucus, N. J., on

C. J. Gerbes

November 27, 1911. He served there successively as machine shop foreman, enginehouse foreman, and general foreman until February 1, 1924, when he was transferred to the back shop at Hornell, N. Y. He was appointed master mechanic on December 1, 1927, and served successively at Hornell, Secaucus, and Avoca, Pa., until March 1, 1938, when he was transferred to Marion.

FREDERICK S. BROWN, retired mechanical engineer of the Erie, died at his home in Meadville, Pa., on April 14. Mr. Brown was born at Susquehanna, Pa., and was a graduate of high school. In January, 1892, he became a blueprinter in the employ of the Erie. He later became a draftsman and in 1902 was transferred to Meadville where he served successively as chief draftsman, assistant mechanical engineer and mechanical engineer. He became chief mechanical engineer at New York in 192[illegible] and at the time of his retirement in 194[illegible] was mechanical engineer at Cleveland.

Trade Publications

Copies of trade publications described in the column can be obtained by writing to the manufacturers, preferably on company letterhead, giving title. State the name and number of the bulletin or catalog desired, when it is mentioned.

◆

PANELBOARDS.—Square D Company, Detroit, Mich. Sixteen-page pamphlet describing a unique method of converting obsolete and inadequate electric light and power panelboards to full efficiency and modernness without disturbing the box or conduit. "Before" and "after" illustrations accompany a brief history of each case.

◆

MACHINE GAS-CUTTING GUIDE.—Air Reduction, 60 East Forty-second Street, New York 17. Pocket-sized, slide-type guide. Shows proper tip sizes, gas pressures, and other data required for machine gas-cutting steel of various thicknesses with Airco "45" and "124" gas-cutting tips.

◆

BATTERY CHARGING.—The Electric Storage Battery Company, Philadelphia, Pa. Sixteen-page booklet covering charging equipment for Exide batteries in motive-power service. Contains detailed description of the two-rate and the modified constant potential systems of charging with numerous diagrams, graphs, and tables.

◆

REXALLOY CUTTING TOOLS.—Crucible Steel Company of America, 405 Lexington Avenue, New York 17. Twenty-six page illustrated catalogue descriptive of Rexalloy, a non-ferrous cutting alloy for "middle range" machining applications.

◆

FORMICA.—Formica Insulating Company, Cincinnati, Ohio. "What Formica Is!", a 32-page booklet descriptive of how it is used in many industries and how it is made and in what grades and types.

◆

LATHES.—South Bend Lathe Works, South Bend 22, Ind. Catalogue No. 150, condensed, illustrates and describes engine lathes, toolroom lathes, and precision turret lathes, also attachments and accessories.

◆

ROTARY SHEARS.—Kling Bros. Engineering Works, 1300-1334 N. Kostner avenue, Chicago 51. Eight-page illustrated Bulletin No. 245 descriptive of Kling rotary shears available in six sizes.

◆

REPAIRING BROKEN CUTTING TOOLS.—Handy & Harman, 82 Fulton street, New York. Sixteen-page bulletin No. 14, "How To Repair Broken Cutting Tools with Easy-Flo."

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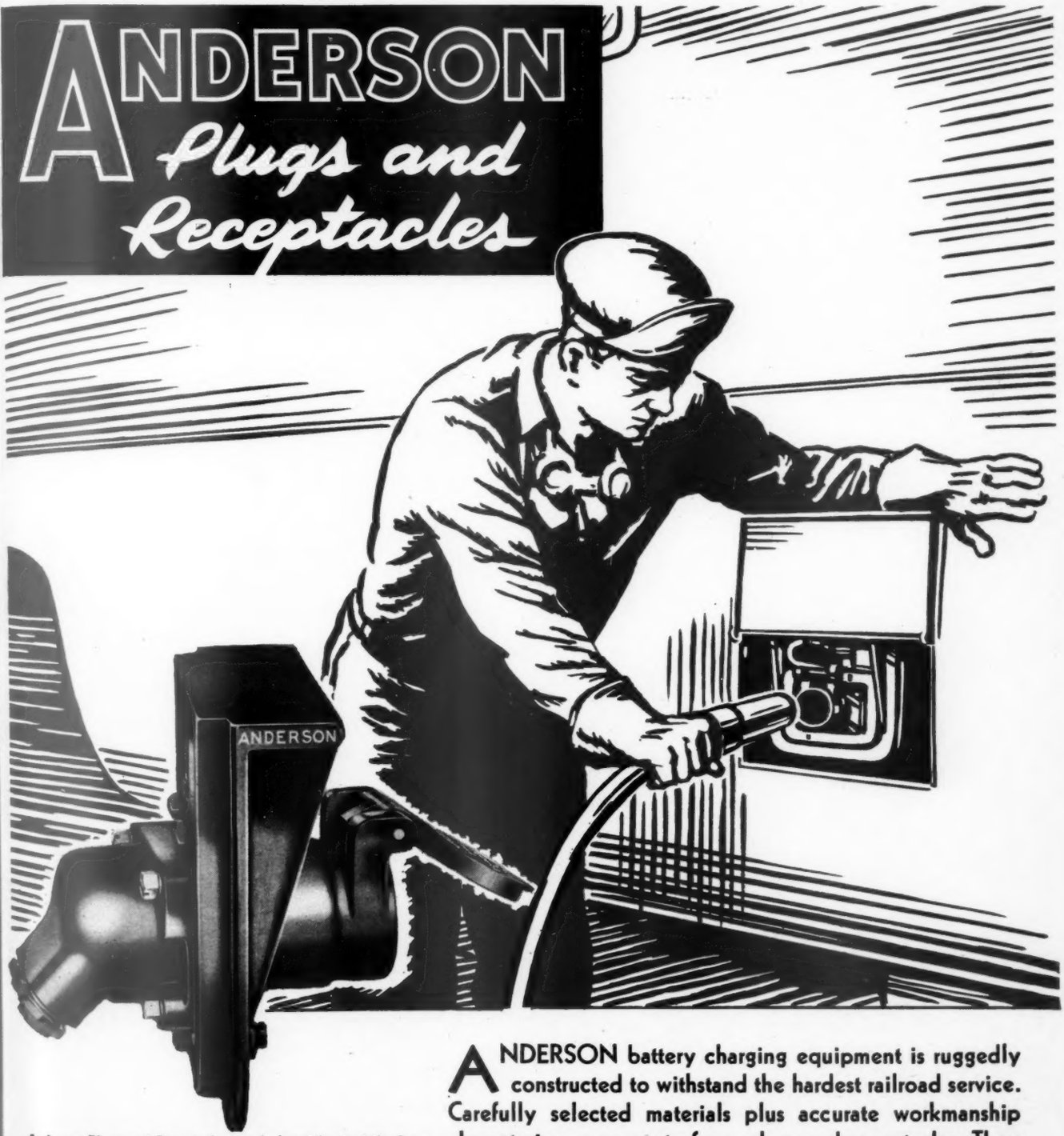

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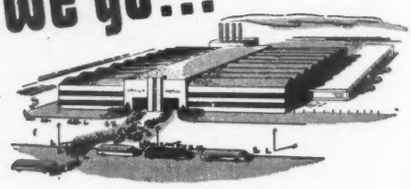

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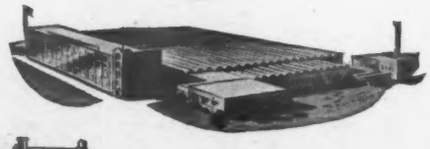

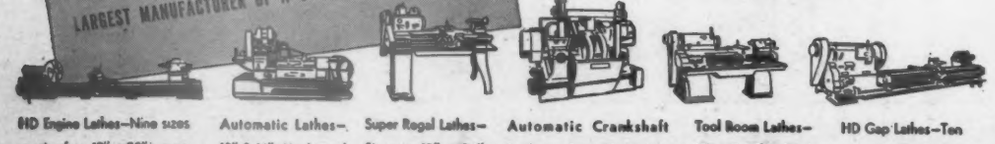

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